FEASIBILITY STUDY ON THE DEVELOPMENT OF AN ELECTRIC CEILING GLASS FAN

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May 1984.

ABSTRACT

This research is conducted to study the feasibility of developing a new product, namely, an electric ceiling glass fan, for the manufacturing company where the author is employed. The main emphasis is on the quantitative analysis. The results are useful to the company in deciding the implementation of the project. It is also quite a good piece of information for concerned parties as a reference.

An introduction of the electric ceiling fan industry is first presented in Chapter I. It is followed by Chapter II where the background and objectives of the project are discussed.

The proposed plan which includes marketing, technological aspect, personnel, budgeted costing and implementation schedule is set out in Chapter III.

Chapter IV presents the analysis of results in terms of financial, risk and qualitative analysis.

Finally the study concludes with a summary of results and several recommendations for the relevant parties who intend to make decision on the development of the new product.

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INTRODUCTION

1.1. The Electric Ceiling Fan Industry

1.1.1. The Development of the Electric Ceiling Fan Industry in Hong Kong

Even before the introduction of air-conditioners, electric ceiling fans have never been popular in Hong Kong because of the low headroom of buildings. The normal average headroom of a flat in Hong Kong is about 8'-6"[1] whereas the installation of an electric ceiling fan requires a minimum headroom of 9'-0" to 9'-6" depending on the model of the fan. As a result, ceiling fans manufactured in Hong Kong are therefore mainly for export.

Hong Kong used to import electric fans from U.K. (G.E.C.), U.S.A. (Westinghouse) and Japan (KDK). But in order to allocate their resources to other maore profitable and sophisticated industries, these developed countries gave up manufacturing electric ceiling fans in early 1960's. From thence, some local manufacturers started to produce electric fans. But very few manufactured electric ceiling fans.[2]

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[1] Will, B.F. "Housing Design and Construction Methods" in Housing in Hong Kong : A Multi-Disciplinary Study, ed. by Luke S. K. Wong, 1975. p. 5.16.

[2] A few electric ceiling fan factories established in 1960's that are still in operations today are :-
a) Din Wai Electric Mfg. Co., Ltd. (Brand : D.E.M.C.)
b) Shell Electric Mfg. Co., Ltd. (Brand : S.M.C.)
c) Union Ngok Kee Electrical Manufactory (Brand : UNION)
d) Wing Tat Electric Mfg. Co., Ltd. (Brand : TAT)

The energy crisis in early 1970's has boosted the demand of ceiling fans among the oil producting countries in the Middle East, namely, Saudi Arabia, United Arab Emirates, Iran, Iraq, Syria, Kuwait, Jordon and Yamen Arab Republic.[3] Among them, Saudi Arabia alone took 21.6%, 37.1% and 47.3% of the total domestic exports of domestic electro mechanical fans from Hong Kong in 1976-78 respectively. (See Appendix 1.)

"After accumulated the oil money, the Saudi Arabian Government launched a large scale of housing scheme in 1977 as a means of improving the living standare of their people. Air-conditioners, being more expensive and complicated to install, are not considered for the very dry and hot weather. Ceiling fans, on the other hand, being more economical and easier to install are preferred in domestic residence and mosques where there is sufficient headroom. In view of the absence of servicing agents in the country, defective fans are simply discarded and replaced because they are relatively cheaper than air-conditioners."[4] Although the export value to Saudi Arabia countinues to grow from HK$17.9 million in 1976 to HK$97.2 million in 1983, yet in terms of percentage share, it was overtaken by the U.S.A. in 1979. (See Appendix 1.) Though it still remains as Hong Kong's second largest market for electric fan exports, its share in value

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[3] Hong Kong Trade Statistics : Exports and Re-exports, Census & Statistics Department, Hong Kong. December issues, 1976-78. SITC 725034 in 1976-77 and SITC 775720 in 1978.

[4] This was revealed by Mr. A. R. Hakbany of Hakbani Brothers & Co., Ltd., the sole agent of "TAT" fans in Saudi Arabia during an interview by the author in Damman, Saudi Arabia, in 1979.

term has declined from a record of 47.3% in 1978 to only 6.8% in 1983. United Arab Emirates has also declined from its share in value term of 17.5% in 1976 to a mere 1.7% in 1983. (See Appendix 1.) Iran and Iraq practically imported nothing in 1982-83 due to war and instability.[5]

The U.S.A. overtook Saudi Arabia as the largest market for electric fans from Hong Kong in value term in 1979 and in quantity term in 1980. The gap continues to widen up to 1983. In 1983, with Saudi Arabia occupying only 6.8% the U.S. market absorbed a record of 81.6% in value term of the total fan exports by Hong Kong, compared with 33.2% in 1979 and only 5.6% in 1976. Exports of electric fans to the U.S.A. have been growing at a remarkable pace between 1979 and 1983 especially in 1979 and 1980 when over 400% annual increase in value term was recorded consecutively. Even in 1981, there was also an annual increase of over 100%. (See Appendix 1.)

The rapid growth of demand of electric fans in the U.S.A. in 1979 was again a repercussion of energy crisis. Electric fans help reducing electricity bills when used simultaneously with air-conditioners because they help circulating the cool air in the room. In winter, most houses in the U.S.A. are equipped with either central heating system or electric heaters. Ceiling fans help to push down the warm air that rises up thus conserving energy consumption significantly. This concept will be elaborated in more detail at Section 2.1 on page 26. In fact, most

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[5] Hong Kong Trade Statistics : Exports and Re-exports, Census & Statistics Department, Hong Kong. December issues, 1982-83. SITC 775720 in 1982 and SITC 775721 in 1983.

fan dealers use 'energy conservation' as the selling point in 1979.[6]

In 1980, similar to garments, costumes, hair style, furniture, music and movies, renaissance also revived in ceiling fans. Big and decorative types of ceiling fan resembling to those Casa Blanca and Hunter type of ceiling fans of early 20th century's were preferred. Lightings are attached to the bottom of the ceiling fan.

At this time, electric ceiling fans can thus be classified into two main types :-

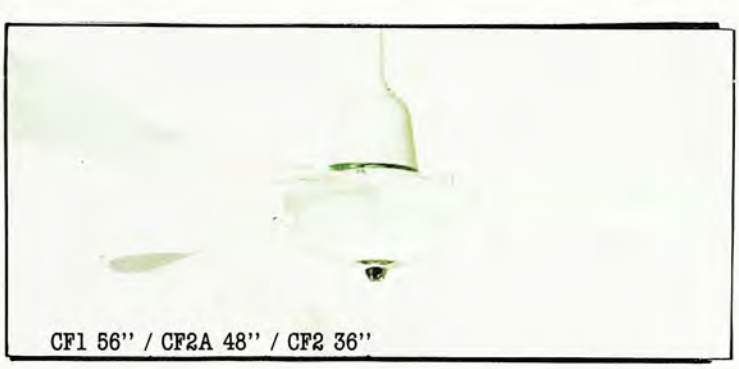
A. Industrial ceiling fan (See Picture 1.)

Features :-

a) Plain painted colour - white, cream, light blue and light green.

b) Three metal blades.

c) Choked type regulator mounted on wall.



Picture 1. An Industrial Ceiling Fan

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[6] This was revealed to the author by Mr. Herman Kuan, Sales Manager of Wing Tat Electric Mfg. Co., Ltd., during an interview in January, 1984.

B. Decorative ceiling fan (See Picture 2.)

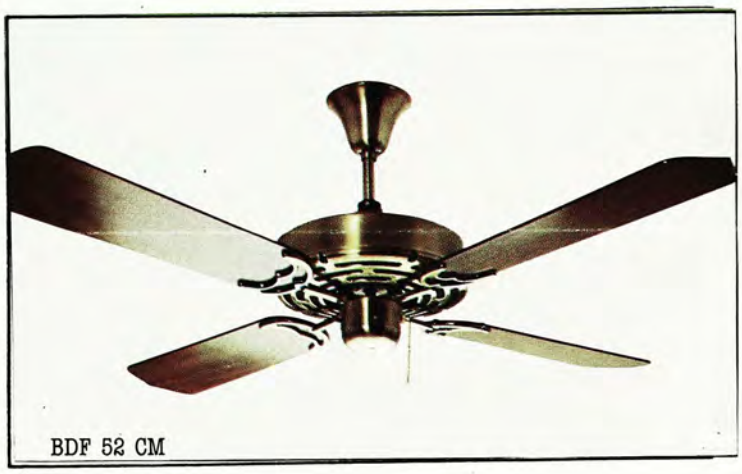
Features :-

a) Electroplated in copper or brass finishes.

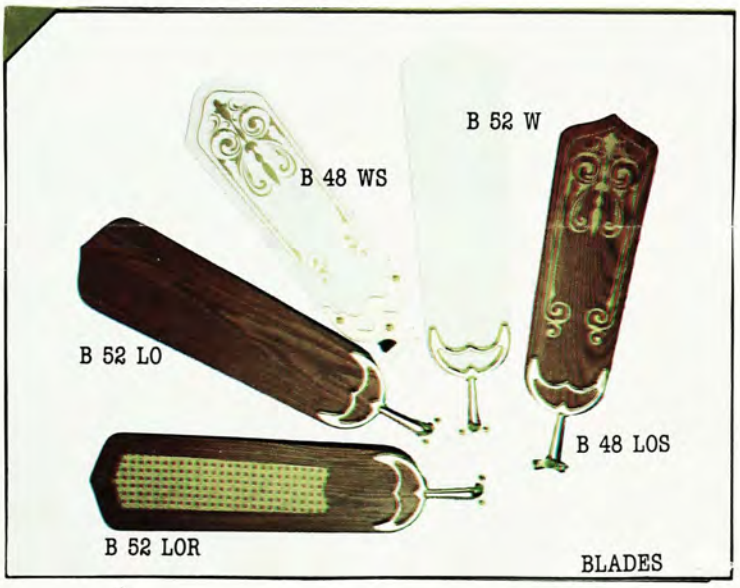
b) Four blades made of hardwood, such as oak, teak or rosewood. Some have rattan insertion or with stencilled pattern. (See Picture 3.)

c) Built-in variable speed control, solid state control, reversible switch with pull chain.

d) Optional lightings attached to the switch housing at the bottom of the fan. (See Picture 4.)



Picture 2. A Conventional Decorative Ceiling Fan



Picture 3. Different Types of Blades for a Decorative Ceiling Fan

Picture 4. A Decorative Ceiling Fan with Optional Lightings

Exports of electric fans to Australia has increased tremendously from a total value of HK$2.4 million in 1976 to a record of HK$69.4 million in 1981. In fact in 1980, occupying 5.5% in value term and 7.4% in quantity term, Australia has since emerged as Hong Kong's third largest market for electric fan exports. (See Appendix 1.) However, in view of the fact that a local manufacturer in Australia, Mistral Ltd., set up its own factory to produce ceiling fans in 1982, the Australian government subsequently imposed a 25% import duty on all imported fans in order to protect their domestic industry. As a result, the exports of fans to Australia dropped from HK$69.4 million in 1981 to HK$41.0 million in 1982, a drop of 41%.

An electric fan used to be a seasonal product for summer. Consequently, April to August is the peak sales season of fans in the Northern Hemisphere. The Australian market is therefore very important to fan manufacturers because of the exactly opposite seasons in the Southern Hemisphere. This fills up the slack period of the fan manufacturers in the months of September to March of the following year.

Though the newly imposed import duty has a serious adverse effect on the fan exports to Australia, yet in order to fill up their production capacity in the slack period, the manufacturers have no other choice but continue to export to Australia at a lower profit margin or even a loss. In June, 1983, Mistral applied to the Australian Customs Service for anti-dumping. Names of several Australian importers and Hong Kong manufacturers were submitted with the application.[7] Enquiries are now carried out both in Australia and Hong Kong. If it is found to be the case by the Australian Dumping Law, the importers have to pay the balance between their imported price and Mistral's selling price in Australia. This will further affect Hong Kong's fan exports to Australia. Australia's percentage share in value term has dropped from 5.5% in 1980 to 3.1% in 1983. (See Appendix 1.)

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[7] Copy of application for anti-dumping and/or Countervailing Duties sent by the Australian High Commission to some Hong Kong manufacturers in December, 1983.

Another major market for Hong Kong's electric fan exports is Canada. But the growth has been quite slow. (See Appendix 1.) Exports to Africa and South America were nominal due to the problem of balance of payment in Europe does not require fans except for some Mediterranean countries such as Italy and Spain. However, not only they have their own fan factories, their purchasing power in term of price level is low when compared with the world market.

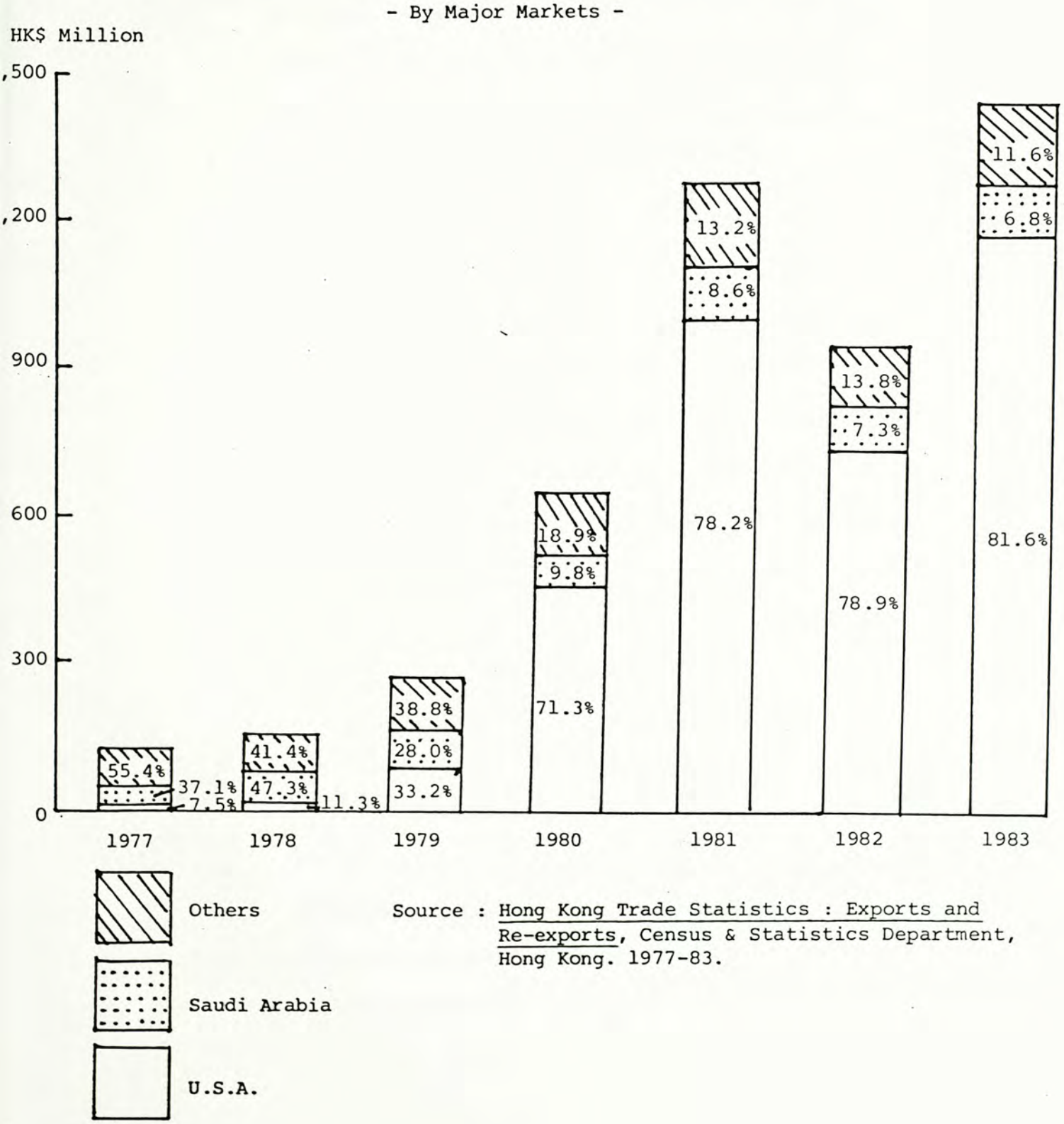
Since it has been relatively easier and less costly for manufacturers to switch to or expand capacity for the production of decorative ceiling fans which consists mainly of simple assembly work, of all the Hong Kong ceiling fan manufacturers, many were started in 1979 to capitalise on the buoyant U.S. demand. There are now about 50 manufacturing establishments of electric ceiling fans. Only few of them is of large-scale. (See Appendix 2.)

In 1983, Hong Kong exported 6.3 million units of electric ceiling fans (see foot-note at Appendix 1) valued at HK$1,431 million. These figures represent more than seven-fold and seventeen-fold increase respectively in quantity and value terms over 1976. But the predominance of the percentage share occupied by the U.S. market (Fig. 1) casts a shadow on the future of the ceiling fan exports from Hong Kong which in turn affects ceiling fan manufacturing in Hong Kong because It is too much a risk to put all eggs in one (U.S.A.) basket.

FIGURE 1

HONG KONG DOMESTIC EXPORTS OF ELECTRIC FANS, 1977-83

- By Major Markets -



Source : Hong Kong Trade Statistics : Exports and Re-exports, Census & Statistics Department, Hong Kong. 1977-83.

1.1.2. The U.S. Market for Electric Fans

After enjoying a period of boom from 1979 to 1981, the U.S. market dropped by 27% in value term in 1982 (see Appendix 1) amidst the economic recession and overstocking brought down from 1981. In 1982, U.S. also suffered from severe cold and early winter which in turn seriously affected the fan business. Appendix 3 shows that the drastic decline started in June, 1982 and struck the bottom in October when a low record of only 42,542 units of fans was reported imported from Hong Kong. This quantity is only 26.4% and 21.9% of the imported quantity in the corresponding months in 1980 and 1981 respectively. It was until March, 1983 that the fan business started to revive and the revival gained pace at a very fast speed falling in line with the rapid recovery of the U.S. economy.

A. Competition

The competition of fan business in the U.S.A. is very keen. According to an article,

"The Electric Fan Market in the U.S.A." by the Hong Kong Trade Development Council in August, 1982.

"Competition in the U.S. market has been strongest from the Taiwanese manufacturers who enjoy a price advantage mainly because of lower production cost due to incentives and facilities given by their government to their manufacturers to boost exports. Starting from 1st January, 1982, the previously duty-free imports of

Taiwan-made fans into the U.S. are subject to a new 6.1% import duty, in the same category as Hong Kong-made fans or Japan-made fans, hence lowering the advantage to Taiwan-made fans. Nevertheless, Hong Kong manufacturers reportedly have an edge in terms of higher product quality, better after-sales services and prompt delivery, although their Taiwanese counterparts have also been upgrading their product quality over the years."

B. Pricing

From Appendix 4, it can be seen that the average export F.O.B. unit price of fan has dropped 31.6% from US$45.83 in 1981 to only US$31.34 in 1983. But in terms of Hong Kong Currency it dropped only 6.4% from 1981 to 1983. This was mainly because of the depreciation of Hong Kong Currency against the strong United States Dollars. From an exchange rate of US$1 = HK$7.80 in 1983, there was an exchange gain of 36.8%. The following shows the devaluation of Hong Kong Currency against the United States Dollars from 1976-1983.

Year	Exchange Rate of US$1.00 to Hong Kong Currency
1976	4.675
1977	4.62
1978	4.80
1979	4.93
1980	5.10
1981	5.70
1982	6.50
1983	7.80

Source : Hong Kong Annual Report, Government Printer, 1976-83.

But as far as the market price of ceiling fans is concerned, depending on market demand and supply, ceiling fans retailed approximately from US$75 to almost US$500 depending on the size, quality, decorative options, length of warranty, and the type of optional light fixtures preferred.[8] Installation costs are expensive and vary from nil for a "do-it-yourself" installation to about US$75 depending on the difficulties encluntered in the installation process.

C. Consumer

The Hong Kong Trade Development Council Callas Office has conducted a survey in 1982 to analyse the type of consumer of household electric fans and the quality sought and reported as follows :-[9]

" a) The person most interested in purchasing home appliances is defined to be generally between the ages of 25 and 40, as this group is setting up a more permanent type of housekeeping and is making the most additions to their home appliances. Currently, this group is a very

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[8] Kuan : Generalised from importers' feedback. Also refer to Table 1.8. on p. 18.

[9] Hong Kong Trade Development Council : 1982.

large group of people in America as they are the people born during the post-World War II baby boom. Therefore the market for home appliances has increased simply due to the fact that more people were demanding these products. An accelerating rate of appliance replacement has also taken place, due to buyers being attracted to new energy-saving and convenience features. All these factors were playing a role in increasing the market for household electric fans.

b) The consumer can further be characterized as wanting "instant gratification". These consumers lead busy lives, full of work and leisure activities, and have less time and less tolerance with unreliable products. They demand a higher quality standard on the products they buy.

c) Sturdiness, design and the finishing of the products are all taken into account. Consumers also prefer the use of steel and metal over plastic in their appliances. Overall, performance was rated as the best way to achieve a reputation of quality, as the use of a product determines very quickly the quality of that product. Performance is followed by other characteristics, such as dependability, longevity, ease of use, ease of service, and

cleanability. Americans are definitely choosy about the products they buy."

The characteristics of ceiling fan end consumers are best presented by a telephone survey conducted to explore the attitudes, awareness levels and preference of the Fort Lauderdale area residents about ceiling fans designed by TAT International Corporation of America[10] in March, 1983. The findings are summerised as follows :-

a) Incidence of Fan Ownership

Of the 740 people surveyed in the Fort Lauderdale area, 10.7% presently at least own one ceiling fan. (Table 1.1.)

	Number	Percentage
Owners	79	10.7%
Non-owners	661	89.3%
Total	740	100.0%

Table 1.1. Incidence of Fan Ownership

b) Demographics of Fan Ownership

The primary consumers are white with higher levels of education and income levels of US$15,000 to US$35,000 annually. The largest age group of fan owners was in the 35-54 age range. (Table 1.2.)

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[10] TAT International Corporation of America is a wholly-owned subsidiary of Wing Tat.

DEMOGRAPHICS (Head of household)	OWNERS	NON-OWNERS	ALL
EDUCATION			
Less than High School	9.0%	13.4%	12.6%
High School	26.9	32.2	31.2
College	42.3	37.9	38.9
Graduate School	7.7	7.5	7.5
Post Graduate School	10.3	3.3	4.6
Vocational or Technical	1.3	2.7	2.8
No Response	2.5	3.0	2.8
EMPLOYMENT			
Major Profession	19.0	9.3	11.1
Middle Profession	5.1	13.1	11.6
Minor Profession	27.8	17.0	19.1
Clerical	6.3	11.3	10.4
Skilled	7.6	12.2	11.4
Semi-skilled	0.0	7.5	6.0
Unskilled	3.8	6.6	6.0
Retired	15.2	16.4	16.2
Housewires	1.3	1.8	1.7
No Response	13.9	4.8	6.5
AGE			
24 and under	6.3	13.8	12.3
25-34	19.0	24.5	23.4
35-54	30.4	33.4	32.9
55-64	25.3	13.4	15.7
65 and over	19.0	14.9	15.7
RACE			
White	92.4	86.3	87.4
Black	7.6	13.7	12.6
SEX			
Female	55.7	52.2	52.9
Male	44.3	47.8	47.1
INCOME			
Below US$15,000	13.9	27.8	25.1
US$15,000 - US$25,000	32.9	32.2	32.4
US$25,000 - US$35,000	25.3	17.6	19.1
Over US$35,000	21.5	12.2	14.0
No Response	6.4	10.2	9.4

Table 1.2. Demographic Characteristics of the Respondents

c) Motivation

Of the reasons for buying a ceiling fan, comfort was the most widely chosen, with 56.4% response. Energy saving was also a substantial motivation, with 23.1% response. (Table 1.3.)

REASONS	PERCENTAGE RESPONSE
Comfort	56.4%
Energy Savings	23.1
Decorative	7.7
Others	12.8
	100.0%

Table 1.3. Reasons for Fan Purchases

d) Brands Owned

Emerson and Hunter, respectively, were the brands most extensively owned, composing 38.1% of all brand available. Another 38.2% of respondents were unable to recall the brand name of their fan. (Table 1.4)

BRAND	PERCENTAGE RESPONSE
Emerson	26.3%
Hunter	11.8
Penny	5.3
Sears	2.6
Casa Blanca	2.5
Moss	1.8
Others	11.5
Do not know	38.2
	100.0%

Table 1.4. Brands Purchased

e) Lightings

Of fan owners, 75.1% of their fans were fitted with lightings indicating the preference of lightings by the consumers. (Table 1.5.)

LIGHTINGS	PERCENTAGE RESPONSE
With lightings	75.1%
Without lightings	24.9
	100.0%

Table 1.5. Fans with Lightings

f) Warranty

Of fan owners, 64.5% of their fans have or had warranties, but 26.6% did not even know if they had a warranty. This shows the large percentage of fans purchased had with them a warranty of some kind. (Table 1.6.)

WARRANTY	PERCENTAGE RESPONSE
With warranties	64.5%
Without warranties	7.6
With and without	1.3
Do not know	26.6
	100.0%

Table 1.6. Ownership of Fans with Warranties

g) Length of Warranty

Of the owners who knew they had warranties, 22.9% had 3 years and 20.0% had 5 years or over warranties. There were 55.7% who did not know the length of their warranty. This large 'Do not know' category indicates that most consumers do not consider fan warranties when purchasing. (Table 1.7.)

WARRANTY DURATION	PERCENTAGE RESPONSE
3 years	22.9%
5 years or over	20.0
Others	1.4
Do not know	55.7
	100.0%

Table 1.7. Length of Warranties

h) Cost

Of the owners, 55.7% cost less than US$150. This shows that most people are not ready to make large investments in ceiling fans. (Table 1.8.)

COST	PERCENTAGE RESPONSE
Below US$100	22.8%
US$101 - 150	32.9
US$151 - 200	7.6
US$201 - 250	5.1
US$251 - 300	5.1
US$301 - 350	2.5
US$351 - 400	1.3
Over US$400	2.5
Do not know	20.2
	100.0%

Table 1.8. Cost of Fans Purchased

i) Awareness

There are several methods by which people became aware of ceiling fans. The principal ones are : advertising (21.5%) relatives, friends and neighbours (31.7%) Therefore, advertising had a significant awareness level. Friends and relatives also had a significant percentage of awareness. Several respondents owning ceiling fans said they had grown up aware of ceiling fans. (Table 1.9.)

CATEGORY	FREQUENCY	PERCENTAGE RESPONSE
Advertising	17	21.5%
Relatives	12	15.2
Friends & Neighbourers	13	16.5
Store Display	7	8.9
Others	30	37.9
	79	100.0%

Table 1.9. How People First Became Aware of Ceiling Fans

To generalise, though the sample of fan owners is small, only 79 respondents, the result of this simple survey did provide some information on the characteristics of ceiling fan consumers which will definitely be helpful and considered for any future marketing survey on new products.

1.1.3. Import Regulations, Duties and Safety Standards in the U.S.[11]

A. Import Regulations

No import licences are required for fan imports into the U.S.A. But the certificate of origin is essential.

B. Import Duty

Hong Kong's electric fans are not eligible for duty-free in the U.S. Generalised System of Preference (G.S.P.) and are subject to an import duty of 6.4%. This was reduced to 6.1% in 1982.

C. Product Safety Standards

In order to be saleable in the U.S. market, electric fans from Hong Kong must be U.L. listed.

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[11] The Hong Kong Trade Development Council, 1982. pp. 9-11.

Underwriters Laboratories Inc., (U.L.) is a non-profit making organization to investigate and test materials, products, constructions, methods and systems for hazards affecting life and property. The Americans are extremely conscious of the U.L. approval on electrical appliances that are used in their homes. Hong Kong manufacturers wishing to export to the U.S.A. must have their products approved and listed by U.L. Most importers refuse to take electric goods which are not U.L. listed.

1.2. The New Product Idea

The remarkable export performance of the electric ceiling fan industry in Hong Kong since 1979 can be accounted for by several factors, most important of which being the surge in demand for ceiling fans in the U.S.A. both for energy-conservation and for decorative purposes.

The energy-conservation concept was applied to the circulation of air when used simultaneously with the air-conditioner. The same level of comfort could be felt at a higher room temperature with additional air movement. At that time, ceiling fans were considered useful during hot or warm seasons and were left idle in winter time.

A breakthrough occurred in 1979 when the reverse speed feature was introduced. Ceiling fans with reverse switches were advertised for energy-conservation purpose both in summer and winter. Instead of driving air downward to create a breeze, resulting in cooling of body temperature in summer time, driving air upward to re-circulate the warmer air near the ceiling could result in a more evenly distributed room temperature

when used with the electric heater in winter time.

Traditional ceiling fans were provided with speed regulators mounted on the wall. Wiring connections of such usually require the service of an electrician and was quite laborious and expensive. The feature of a built-in control box underneath the ceiling fan enabled installation possible of "do-it-yourself". Some were also provided with lightings at the bottom of the ceiling fan.

An outlook of renaissance was brought about, featured by four hardwood blades and a large plated decorative casing.

Although the reverse speed feature did once stimulate the market, it was not widely accepted and was even considered as a kind of gimmick by some consumers.

1.2.1. U.S. Imports of Decorative Ceiling Fans

As mentioned in Section 1.1.1. on pp. 3-4, renaissance occurred in ceiling fans in U.S.A. Decorative ceiling fans overtook all other electric fans and industrial ceiling fans as the major household fans. As the consumers demand a higher quality standard products, decorative ceiling fans became predominate. The U.S. imports of decorative ceiling fans for years 1979-81 are shown in Table 2 below :-

Year	C.I.F. Value in US$M	% Growth
1979	101.5	-
1980	187.2	84.4
1981	346.0	84.8

Table 2. Growth in U.S. Imports (C.I.F. value) of Decorative Ceiling Fans

Source : Merchandising, September, 1983. p. 25.

1.2.2. The Development of a New Tdea

As indicated in Table 2 above, U.S. imports of decorative ceiling fans enjoyed a growth rate of 84.4% in 1980 and 84.8% in 1981. In fact, up to 1977, the U.S. fans market was dominated by industrial ceiling fan which consisted of three metal blades, plain painted colour with wall-mounted control on the wall. In 1977-79, the customers' demand shifted to semi-decorative ceiling fan which consisted of four wooden blades with brown painted colour and built-in switch control below the motor. But from 1979 onward, the fashion was decorative ceiling fan which consisted of four wooden blades, copper and brass plated with built-in switch control below the motor and light adaptable as described in Section 1.1.1. on p. 5.

The number of blades increased from three blades to four, five and even six blades. The materials of blades shifted from aluminium, mild steel, wood, wood with rattan insertion and stencilled wood.

Conceptually, a ceiling fan was no longer a fan that helped ventilating a room but a lighting when it was fitted with light features and eventually it had become a piece of elegant and luxurious furniture. The retail price was sometimes as high as US$300 excluding the price of the lightings, the cost of which varied tremendously. The general phenomenon was that decorative ceiling fans were then commonly sold in lighting stores than in electrical appliance shops more advertisements were found in lighting magazines such

as "Home Lighting & Accessories" rather than in house-ware magazines.

However, there are some draw-backs in the decorative ceiling fan line, commonly known in this trade as Casa Blanca (CB) type of decorative fans because of their resemblance to the old-fashioned early 20th century Casa Blanca fans :-

a) To accommodate a whole set of 6" upper canopy, 8" motor, 6" switch housing and 8" light fittings, the decorative ceiling fan requires a clearance of at least 3'-0" from the ceiling.

b) The decorative ceiling fan is expensive. A CB fan is ideally to be equipped with light fittings. Not only the fan is expensive with a retail price of US$100-300, the lightings are also very expensive ranging from US$50-150. A decorative ceiling fan is not complete if it is not fitted with lightings.

c) The fan and the lightings are supplied by different suppliers because the fan manufacturers do not make glasses and lightings. So sometimes matching is very difficult.

d) Blades are made of solid wood or with rattan insertion which cast shadows on the ceiling when the fan is on.

WHAT WILL BE THE MARKET DEMAND FOR A PRODUCT HAVING A COMBINATION OF FEATURES OF BOTH A CEILING FAN AND A LIGHTING?

Such a question is difficult to answer. However it is exactly the question which has led to the development of the new product - the CEILING GLASS FAN with the realization of the following objectives :-

a) To reduce the clearance from the ceiling so that a ceiling glass fan can be installed in a room with a headroom of as low as 8'-6". Ways must be found to eliminate the upper canopy and downrod.

b) To reduce cost by incorporating lightings into the fan.

c) To provide more elegant blades by using translucent blades to allow light to pass through.

CHAPTER II

BACKGROUND

The idea of incorporating lightings into a decorative ceiling fan was originated by Moss Mfg. Inc. of U.S.A. in late 1982. Wing Tat Electric Mfg. Co., Ltd. of Hong Kong was assigned to attempt to develop the product. After nine months of dedicated effort in research and development, the first pilot run commenced in September, 1983 and the first shipment was effected in December the same year. Moss has registered world-wide patent right while Wing Tat was contracted as the sole manufacturer of the ceiling glass fan, better known as High Society $_{TM}$ (Model HFGO Series).

2.1. Description of a Ceiling Glass Fan

A sectional view of the most common decorative ceiling fan (CB model) is shown in Diagram 1 below :

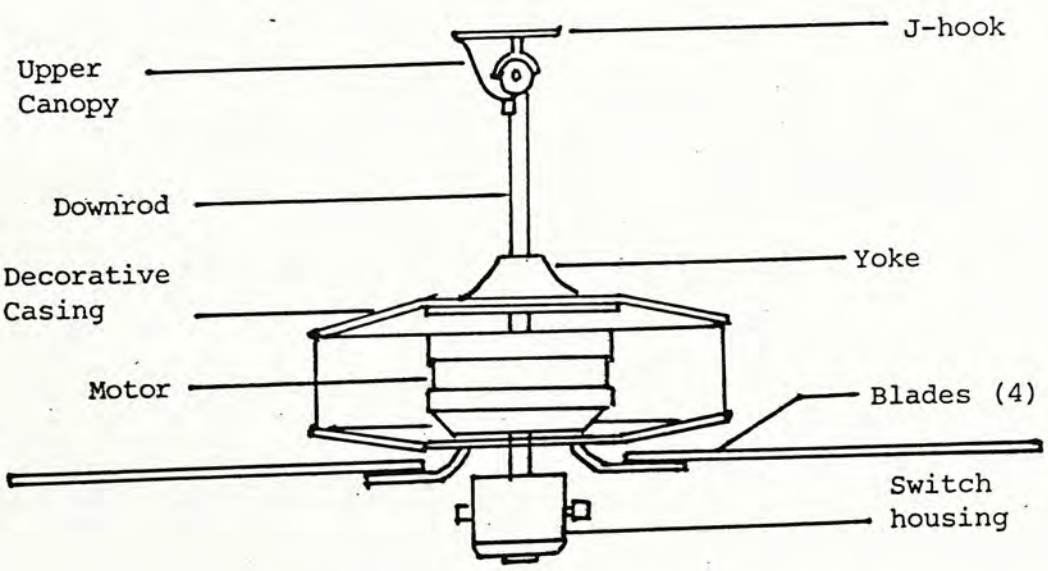

Diagram 1. Sectional View of a Common Decorative Ceiling Fan (CB Model)

The main difference between a ceiling fan motor and motors for other applications lies in the construction of moving and stationary parts. Ordinary motors have stationary casings and rotating centre shafts. A ceiling fan motor is usually contructed such that the centre shaft remains stationary while the motor casing rotates with the blades.

During warm weather, a ceiling fan is run in the forward direction to drive air downward for cooloing purpose. It serves a ventilation purpose and the circulation of air keeps the room temperature down.

During cool weather, a ceiling fan is run in the reverse direction to drive air upward and bring the warmer air near the ceiling downward to have a more evenly distributed room temperature when used together with a heater or central heating system. (See Diagram 2.)

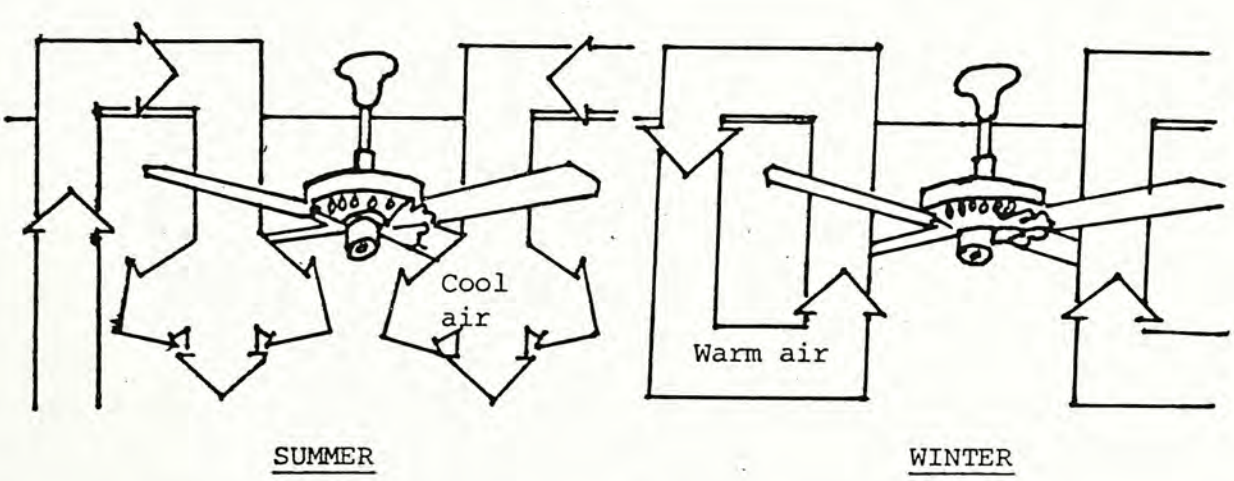

Diagram 2. Effect of a Ceiling Fan in Summer and Winter

In general, special features that distinguish the ceiling glass fan from a common decorative ceiling fan are :-

a) A flushmount fan is used which does not require an upper canopy and a downrod.

b) Translucent blades are used.

C) Instead of a metal centre band, a translucent glass centre band with decars is used.

d) Glass and decars on both the glass centre band and blades are matching.

e) 4 light bulbs are incorporated in the fan between the fan motor and the translucent glass centre band.

f) There is an independent built-in control switch to control the function of four light bulbs and an optional lighting attached to the switch housing.

Please refer to Diagram 3 below which shows a sectional view of the ceiling glass fan.

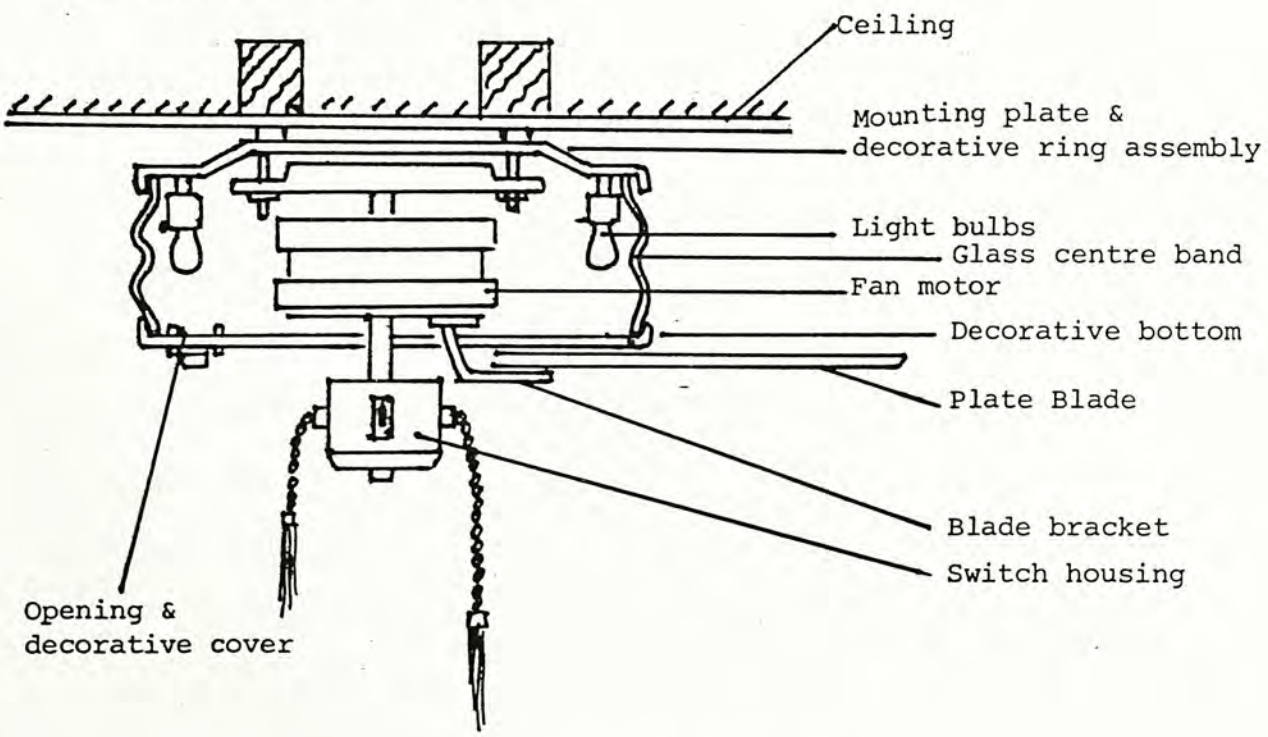

Diagram 3. Sectional View of the Ceiling Glass Fan

The ceiling glass fan has several advantages over the decorative ceiling fan :-

A. It allows lower headroom

The flusmount fan is a ceiling fan which eliminates the requirement of the upper canopy and the downrod. The top mounting plate is firmly attached to the built-in structure of the ceiling. It also improves the replacement of airflow at the ceiling because of the modification of the angle of the pitch of the blade brackets. The flushmount fans has been quite popular since it's introduction to the U.S. market in 1982. It allows lower headroom of 8'-6" for the installation of a ceiling fan.

B. Elegant outlook of the glass

The glass centre band and the glass inserted blades are beautifully stencilled with flowery decars. They are elegant and high class.

C. Easily accessible to light bulbs

The translucent glass centre band is held firmly by both the top mounting plate and the bottom decorative plate. Four lampholders for four light bulbs are installed equidistantly on the top mounting plate. There are four openings on the bottom decorative plate. Each of them is shielded by a decorative cover which can easily be removed for the easy accessibility to the light bulbs in case a replaecment is required.

D. Optional lighting

Similar to other decorative fans, an optional lighting could also be installed to the switch housing. Therefore the top lighting is an additional feature to a decorative fan with lightings.

E. Unique control switch

The control switch is unique in the ceiling glass fan.

In addition to a normal forward/reverse switch of a fan and a speed pull-chain switch for the fan, there is a unique control switch for lightings by which four functions can be done :-

a) Only the top light bulbs are "on".

b) Only the optional light kit is "on".

c) Both the top light bulbs and the optional light kit are "on".

d) Both the top light bulbs and the optional light kit are "off".

Customers are therefore having a better selection of the function of the lights they want in addition to the choice of fan functions.

F. Lower price

As mentioned at Section 1.2.2. on p. 23, the retail price of a decorative fan with lights may cost as much as US$150-450. Now because of the incorporation of lightings in the fan by the fan manufacturers, the retail price could be as low as US$100-150. This price range is acceptable to the U.S. consumer as indicated on p. 18. It is a fan which provides the same feature as a decorative fan plus lightings. The retailers also save the trouble of sourcing lightings to match the decorative fan.

G. Single unit packing

The packing of the glass fan is so designed that the glass centre band and light bulbs are packed together with the fan. It avoids the trouble of two packages customers have to carry when they buy a fan and lightings separately. Single unit packing is particularly welcome in supermarkets and chain stores in the U.S.A.

2.2. The Present Situation of the Company

The establishment of Wing Tat Electric Mfg. Co., Ltd. dated

back to 1960. The company grew from a small tranformer manufacturer to a large size electric appliances factory in 1977 following the trend of the growth of ceiling fan industry in Hong Kong. (See Table 3.)

Due to the rapid growth of demand of ceiling fans in the Middle Eastern markets in the late seventies, Wing Tat had expanded its facilities to increase its production capacity about four-fold during the period from 1977 to 1981 and became one of the largest electric ceiling fan manufacturers in Hong Kong.

At present, Wing Tat has four plants occupying a total floor area of over 200,000 sq. ft., with a total work-force of about 950 workers. Her subsidiary company, Fan Tat Mfg. Co., Ltd. is a joint-venture between Wing Tat and her counterpart in Saudi Arabia. Fan Tat is located in the Tai Po Industrial Estate, occupying a floor area of 160,000 sq. ft. and a work-force of about 350 workers. Fan Tat is also manufacturing ceiling fans. Their main product is the traditional industrial ceiling fan and their major market is Saudi Arabia.

In 1982, in order to secure a stable buyer, Wing Tat again formed a small joint-venture company[12] with Ritz Fan Co., Ltd., a major importer from the U.S.A., to assemble decorative ceiling fans for the U.S. market. The Decorative Fan Section of Wing Tat was set up in early 1981.

The company has undergone very rapid expansion and enjoyed satisfactory earnings from 1977 - 1983. (See Table 3.)

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[12] Lite Tat Mfg. Co., Ltd.

Year	Annual Sales Turnover (HK$M)	Annual Growth Rate (%)	Net Profit before Taxation (HK$M)	Net Profit Margin (%)
1976	21.3	-	1.8	8.5
1977	28.5	+33.8	6.4	22.5
1978	35.1	+23.2	7.0	19.9
1979	48.3	+37.6	7.2	14.9
1980	64.0	+33.5	9.3	14.5
1981	119.1	+86.1	19.6	16.5
1982	80.9	-32.1	12.9	15.9
1983(unaudited)	141.3	+66.4	24.0	17.0

Table 3. Annual Sales Turnover and Net Profit Before Taxation of Wing Tat Electric Mfg. Co., Ltd. (1976-1983)[13]

The company encountered a drastic recession in 1982 due to the following main reasons :

a) Low priced industrial ceiling fans from Mainland China penetrated into the Saudi Arabian Market.

b) Import duty of 25% was imposed on ceiling fan imports to Aus-ralia.

c) Recession in demand of ceiling fans in the U.S.A. market due to a slump in demand amidst the persistently sluggish economy and overstocking among the importers early. But a quick recovery is seen in 1983 and a record of sales turnover of HK$141.3 million was achieved in 1983 by gaining an annual growth of rate of 66.4%. The company is quite optimistic about the future of ceiling fan business.

2.2.1. The Products of the company

Due to the increasing demand of ceiling fans which had always been ahead of production capacity, Wing Tat had abandoned other opportunities of product diversification until late 1981 when a recession in demane of ceiling fans was anticipated.

Before 1982, Wing Tat produced only a single type of

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[13] Directors' Annual Report, Wing Tat Electric Mfg. Co., Ltd. 1976-82.

products, the ceiling fans, although there were numerous models. The company started to diversify into other fan products such as industrial pedestal fan and exhaust fan in early 1982.

Towards the end of 1982, the company took over a small electrical appliances manufacturer and diversified into other electrical products such as sandwich toasters, travelling irons and air heaters.

Despite the continued effort toward product diversification in 1982-83, the sales revenue generated from products other than ceiling fans constituted only 5.4% of the total sales turnover. When the fan business reviewed in 1983, the company gave up manufacturing other electrical products.

2.2.2. The Market of the Company

The company started its business relationship with Saudi Arabia in 1966 and the company's business has been dominated by the Saudi Arabian market since then. The Saudi Arabian agent trades on open account with Wing Tat and remittance of payment had always been ahead of shipment until the winter time of 1979 when the payment from the customer the first time in history was remitted 30-45 days after shipment.

The company has been trying hard on market diversification since 1979. The following table shows the proportion of sales turnover by major markets :-

Proportion of Sales Revenue (%)

Year	Saudi Arabia	U.S.A.	Canada	Australia	Others
1976	95.4	1.5	-	-	3.1
1977	94.2	2.6	-	-	3.2
1978	87.8	5.4	-	-	6.8
1979	78.1	9.7	-	3.7	8.5
1980	67.4	15.1	-	9.8	7.7
1981	53.1	27.7	-	14.4	4.8
1982	44.4	45.8	3.5	2.6	3.6
1983	41.8	43.2	7.8	5.3	1.8

Table 4. Proportion of Sales by Major Markets of Wing Tat Electric Mfg. Co., Ltd. (1976-1983)

As can be seen from Table 4 above, U.S.A has overtaken Saudi Arabia as the major market of Wing Tat since 1982. This was mainly because of the rapid growth in demand of ceiling fans in U.S.A. while the demand from Saudi Arabia remained practically stagnant. Wing Tat was a slow-starter to the U.S.A. market because of its commitments to Saudi Arabia. That is why despite the recession in the U.S. in 1982, Wing Tat could still enjoy a relative growth in the U.S. market when compared with Saudi Arabia. Because of this marketing strategy, Saudi Arabia is still occupying over 40% of Wing Tat's capacity.

The decline in sales to the Australian market was mainly due to the setting up of a ceiling fan plant by Mistral Ltd. in April, 1982 and the subsequent imposition of 25% import duty by the Australian Government on all imported fans in order to protect their domestic industry. (See Section 1.1.1. P.6.) But in order to fill up the production capacity in slack period in winter, sales is still made to the Australian market at a lower profit margin or at breakeven.

2.2.3. Expansion and Vertical Intergration

Being a production-oriented company, Wing Tat has been placing a lot of emphasis on expansion of production capacity, improvement of productivity, and cost reduction projects.

The following is a brief description of main projects implemented since 1978 :

Year	Description
1978	Acquisition of an additional plant of 45,000 sq. ft. for Sub-fty. No. 1. Automation of motor lamination sheet punching. Automation of electro-static painting.
1981	Moving and expansion of main factory from San Po Kong to Yau Tong. Automation of stator winding. Set-up of Decorative Fans Section. Acquisition of another 14,700 sq. ft. for Sub-fty. No. 2 Set-up of Aluminium Die-casting Section. Set-up of Moulds and Dies Section.
1982	Set-up of Electro-plating Section. Moving and expansion of Fan Tat (Subsidiary Company) to Tai Po Industrial Estate. Set-up of a joint-venture, Lite Tat Mfg. Co., Ltd., with a U.S.A. customer to manufacture decorative ceiling fans. Set-up of Industrial Pedestal Fan and Exhaust Fan Section. Taking over of a small electrical appliances manufacturer.
1983	Set-up of TAT International Corporation of America in Fort Lauderdale, Florida, U.S.A.

There are many smaller projects implemented during that period but not shown in the above summary. To generalize, most of the projects can be classified into four main groups :

1. Expansion of production capacity, e.g. acquisition of additional factory premises.
2. Automation, e.g. automation of electro-static painting, and stator winding.

3. Vertical intergration e.g. set-up of Aluminium Die-casting Section and Electro-plating Section.
4. Product diversification e.g. set-up of Industrial Pedestal Fan and Exhaust Fan Section, and taking over of a small electrical appliances manufacturer.

2.3. A Review of Product Development Theories and Concepts

2.3.1. Definition

There seems to be no universally accepted definition of the term 'development'. Anderson[14] has formulated a definition along the following lines :

"A development function is one which draws upon ideas generated both internally and externally to design new products, and to improve existing ones either in relation to manufacturing costs or performance. In this role it strives to present to the company management data on which decisions on whether to introduce new products or processes may be taken, and to provide the manufacturing department(s) with adequate drawings and instructions to allow production of developed products to proceed."

2.3.2. The Importance of Product Development

Andrews[15] has pointed out. "Although the number of years a company may survive without new product successes varies enormously according to the product they market, the ultimate inevitability of slipping sales is fairly predictable for any company which assumes that its products will

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[14] Anderson, N.G. From Concept to Production. Taylor & Francis Ltd., London. 1975. p. 24.

[15] Andrews, B. Creative Product Development. Longman, London and New York. 1975. p. 2.

have a continuing stable demand." He continued, "No matter how apparently stable demand may be for a particular product or service it will sooner or later be affected by the 'product life cycle'. Products, like people, are subject to the same mysteries of birth, growth and death."

The following figure[16] illustrates the product life cycle (PLC) theory. "In its simplest terms the theory maintains that every product has its beginning (its birth as a new product), its growth into maturity, and its eventual decline and demise as it is affected by socio-economic changes and other new products."[17]

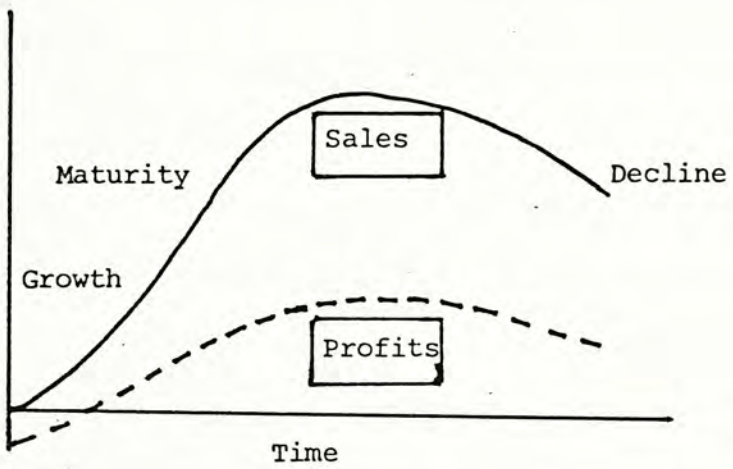

Figure 2. Product Life Cycle

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[16] Andrews, 1975, P. 3.

[17] Andrews, 1975, P. 3.

Mare[18] has rightly pointed out that "..... a firm has to invest in new products and eventually in new assets if it intends to survive in the long term : 'it has to spend money to make money'!" He continued, "On the one hand, therefore, each firm attempts to increase its own life-cycle profit from the sale of its products, whereas, on the other hand, it attempts to match if not excel the life-cycle benefits arising from the purchase of its competitors' products." Therefore, product development is essential to a manufacturer in the long run.

2.3.3. The Scope of Product Development

Anderson[19] has distinguished a number of stages in product development which may be enumerated as follows :

A. The exploration state

This exploration involves exploitation of research resources, both internally and externally. If the idea appears to be feasible, a feasibility study will be carried out.

B. The feasibility stage

To carry out a study on whether the proposed product is feasible both technically and producibility. This involves calling upon the research facility for assistance, and consultation with the production personnel on the technical proposals. This stage will result in a feasibility report.

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[18] Mare, R. F. de la. Manufacturing Systems Economics, Holt, Rivchart and Winston Ltd., Northern Ireland, 1982. p. 53.

[19] Anderson, 1975. pp. 40-42.

C. The development proposal stage

To provide the information on which a decision on whether to proceed with the proposed development can be based. The work will result in a development proposal.

D. The development stage

To provide a target specification for the proposed product. To design the new product so that it can be made with the existing production facilities. To provide information on which to base a decision on whether to proceed with the manufacturing. This will include such items as capital investment requirements; reliability and quality; manufacturing cost and efficiency.

E. The pilot-production stage

To assist production personnel to set up a small-scale trial production of the new product in order to rectify any design faults and confirm suitability for production.

Since the ceiling glass fan has been proved to be feasible both technically and from the point of view of producibility, the project is now in the development proposal stage, on which this proposed report will concentrate and be prepared.

2.3.4. Outline of the Development Proposal

There are no fast rules for the preparation of a development proposal. Anderson[20] has suggested that the following aspects should be covered :

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[20] Anderson, 1975. pp. 90-95.

A. A description of the proposed product

B. The development plan

This outlines how it is proposed to achieve the objectives of the development project. A development plan could cover the following stages :

a) feasibility study,
b) development,
c) pilot production,
d) production

C. Resources

This includes capital equipment, production facilities, factory premises, personnel, tools and materials, etc. The lead time required should also be considered.

D. Cost

This includes a detailed breakdown of the cost and when they are likely to be incurred.

2.3.5. Evaluation of the Project

A. Market and technical evaluation

Fogg[21] has suggested to establish market and technical criteria upon which to rank proposed projects. This is usually accomplished by obtaining a consensus of key marketing, management, production and technical personnel. Selection factors usually hinge on :

a) The chance of technical success.
b) The chance of an invention leading to a substantial competitive advantage.
c) Sales potential.
d) Extent of fit with existing businesses or strategic goals.

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[21] Fogg, C. D. 'The Market-Directed Product Development Process', Research Management, September, 1977. pp. 25-32.

The following is a typical list of ranking criteria :

a) Technology

i. Good Chance of Success : The higher the better.

ii. Using Existing Expertise : Availability of skilled and capable personnel.

b) Marketing/Business

i. Market Size and Growth : The bigger and the higher the better.

ii. A Potential Advantage : The greater the advantage the better.

iii. Market Position

iv. Synergy : Fits not only business charter, but would utilize existing sales force and distribution system.

B. Financial evaluation

To assess profitability by the following criteria[22] :

a) Net present value

b) Pay-back period

c) Rate of return

d) Break-even analysis

e) Sensitivity analysis

C. Risk appraisal

Fogg[23] has given an estimate of typical numbers of projects needed to get one market success.

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[22] "Manual for the Preparation of Industrial Feasibility Studies", United Nations, 1978. p. 151.

[23] Fogg, 1977. p. 26.

Stage of Development	Typical no. of Projects need to get One Market Success
Idea	40
Technical Search	10
Technical Feasibility	6
Prototype	3
Pilot	2½
Launch	2
Success	1

Given that the ceiling glass fan project is now in the 'Prototype' stage, the chance of market success is about one third.

Crawford[24] has tallied the reasons that eight investigators have cited for new product failure.

Reasons for New Product Failure	Consensus of investigators
1. Lacked meaningful product uniqueness[a]	8 out of 8
2. Poor planning[b]	6 out of 8
3. Timing wrong	5 out of 8
4. Enthusiasm crowded on facts	5 out of 8
5. Product failed	3 out of 8
6. Product lacked a champion	1 out of 8
7. Company politics	1 out of 8
8. Unexpected high product cost	1 out of 8

a. In some cases there was, in fact, no difference, but in most cases there was some difference, whose value was overestimated by the marketers to potential buyers.

b. Includes poor positioning, poor segmentation, underbudgeting, poor overall theme, over pricing, and all other facets of a plan.

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[24] Crawford, C.M. 'Marketing Research and the New Product Failure Rate', Journal of Marketing, Vol. 41. April, 1977. pp. 51-61.

2.3.6. Estimation of Market Potentials

Boyd and Massy[25] have pointed out two basic approaches to the determination of absolute market potentials :

a) Based on current sales of the industry in question and related industries.

b) Estimates "built up" from information on the use opportunities of various customer classes.

Projection of these estimates forward in time involves the prediction of :

a) Basic trends in consumer tastes.

b) Changes in technology.

c) Changes in population by region and by age group.

d) The general level of economic activity.

2.3.7. Pricing for New Products

Andrews[26] has suggested the following approaches to the pricing for new products :

A. Pricing based on consumer's satisfactions

Four main components which people are willing to pay for in most new products are :-

a) The product's performance

b) The degree of innovation over existing products

c) The product's image

d) The brand name of the product

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[25] Boyd, H.W. and Massy, W.F. 'The Analytical Problem Solving Approach to Marketing', Marketing Management, Harcourt Brace Jovonovich, New York, 1972.

[26] Andrews, 1975. pp. 195-203.

B. Pricing in relation to other products

Price for a new product can sometimes be determined by reference to the established level of competing products.

C. Pricing from market research

Pricing decision models can be found by qualitative or quantitative market research.

2.3.8. Outline of the Feasibility Study

The outline of this feasibility study will cover the following topics :-

A. Project background and history

B. Market and plant capacity

C. Materials

D. Plant layout

E. Project engineering

F. Organization and overhead costs

G. Manpower and personnel

H. Implementation Scheduling

I. Financial and economic evaluation

2.4. Objectives of the Project

After consideration of the present situation of the company and the nature of the project, the main objectives of the project, in order of priority, are set as below :

A. Generation of satisfactory return on investment of the project at an acceptable level of risk.

B. Cultivation for a new potential product market development in future.

C. Utilization of excess floor space, production equipment and facilities being available at the present moment :-

a) Floor space about 22,000 sq. ft.

b) Existing equipment and facilities include :

i. Electro-plating facilities

ii. Aluminium die-casting facilities

iii. Motor assembly facilities

iv. Moulds,dies, and toolongs in common with conventional decorative fans

D. Consumption of the stock of component parts in commom with conventional decorative fans.

E. Absorption of excess manpower.

2.5. Scope of Study

The Scope of Study of this report is set out as follows :-

A. Marketing

This includes the study and determination of :

a) Product applications and features

b) Target markets

c) Product range

d) Distribution channels

e) Sales volume forecast

B. Technological

This includes the study and determination of :

a) Manufacturing processes

b) Material resources

c) Machineries, equipment, toolings and facilities

d) Plant area and layout

e) Production capacity and output

C. Personnel

This includes the study and determination of personnel and manpower required for administration,

production, quality control, plant and machinery maintenance.

D. Financial Budgets

This includes the analysis and budgeting of :

a) Initial investment and subsequent cash flows

b) Coasting

c) Profit and loss statements

d) Balance Sheets

E. Implementation Schedule

This includes a plan for the timing of various activities required for the implementation of the project.

F. Investment Appraisal

This includes an analysis on the financial returns and a risk analysis of the project.

CHAPTER III

THE PROPOSED PLAN

3.1. Marketing

The setting of marketing parameters is based mainly on experience, feedback from customers, historical data, and constraints in other aspects.

3.1.1. Product Applications and Features

The product is aimed for household applications serving the purposes of conventional ceiling fans, lightings and decorative functions.

Following is a brief description of the main features and variations of the product :

i) Sweep size - 52"

ii) Outlook - different materials, styles or appearance of decorative casing, translucent glass centre band, wooden blades with translucent glass insertions, blade arms, and switch housing, etc.

iii) Finishes - bright brass platings

iv) Voltage - 110V

v) Frequency - 50 Hz and 60 Hz

vi) Fan speed control - 3 discreate speeds (OFF, HI LO, MED) by a pull chain switch.

vii) Reverse speed control by a slide switch (FORWARD, REVERSE)

ix) Lights control by a pull-chain switch for four functions :-

- Only the top light bulbs are "on".
- Only the optional light kit is "on".
- Both the top light bulbs and the optional light kit are "on".
- Both the top light bulbs and the optional light kit are "off".

3.1.2. Target Markets

Up to the present moment, decorative ceiling fans are only sold in the U.S.A. and Canada. Ceiling fans sold in the other countries are of industrial type only.

Hong Kong domestic exports of electric fans have been dominated by the U.S.A. market since year 1979 and it reached about 82% of Hong Kong exports in 1983. (See Appendix 1.)

Since the basic outlook of the ceiling glass fan is derived from that of the decorative ceiling fans which are only popular in the U.S.A. market, in order to minimize the effort for the promotion of the new product to obtain the same level of return, the U.S.A. market is chosen to be the dominant target market for the product.

3.1.3. Product Range

The targeted production output of the new product is very small when compared to the total demand of ceiling fans in the U.S.A. market. There is also to be little or even no competition from other manufacturers at least in the early stage due to the design registration, by the originator, Moss Mfg. Inc. So in

order to minimize the initial investment on items such as tooling and inventory, the product range is limited to as little variations as possible in the first year. The product range is to be expanded in subsequent years if the product is acceptable to the market.

3.1.4. Distribution Channels

The following table presents a normal channel of distribution of sales in the world market according to previous experience.

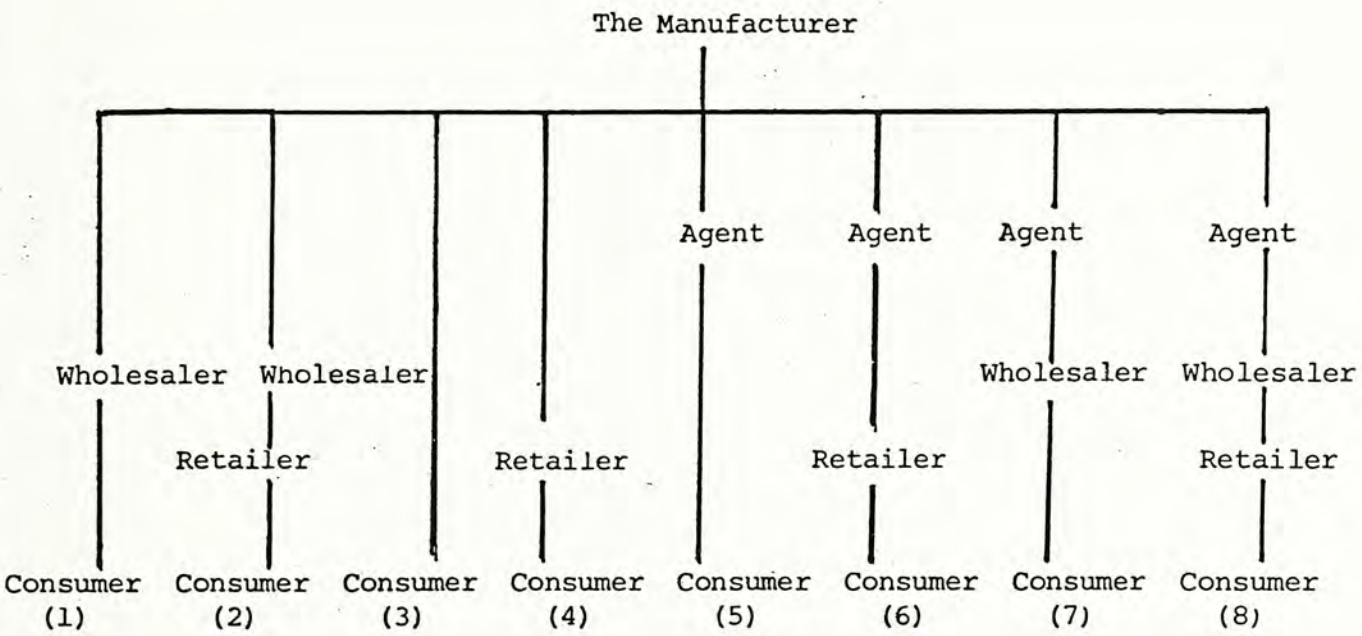

Figure 3. Chart Showing Various Distribution Channels

Channels (1), (2), (3), & (4) where no agent or importer is involved require more marketing effort in selling to wholesalers and retailers in the market, and more working capital as credit terms given to them.

Channels (5), (6), (7), & (8) are more suitable for export sales from a manufacturer geographically outside the market. In this case, the cost of control is lower when compared with channels (1) to (4).

In general, most ceiling fan manufacturers in Hong Kong are selling through channels (5) to (8) except some large and aggressive manufacturers who set up their own warehouses and stores to sell through channels (1), (2), (3) or (4) in addition to channels (5) to (8).[27]

However, such a marketing policy is not welcome by agents or importers because they have to compete with the manufacturer in selling directly to wholesalers or retailers. In many cases, the agents and importers threaten to place orders somewhere else if they anticipate the manufacturers to sell directly to the market. This is particularly true in the U.S.A. market.

No manufacturer in Hong Kong is now selling ceiling fans without agents or importers in the U.S.A. market.

In this project, Moss Mfg. Inc. of U.S.A. has obtained a world-wide design registration of the ceiling glass fan (High Society Fan) and Wing Tat has been assigned as the sole manufacturer of the new product. Marketing at the initial stage is therefore to be undertaken by Moss. Their usual channels of distribution are to sell to chain-stores and retailers directly. They undertake to market the new product in a national-wide basis and sometimes across the border to Canada.

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[27] TAT International Corp. of America is a warehouse, sales promotion store and a servicing centre of Wing Tat.

Agreement has been reached that Wing Tat will only produce for Moss in the first six months. After that Wing Tat is to be given right to sell the product to other importers in U.S.A. or to other markets provided a loyalty fee of 5% on the F.O.B. price is paid to Moss.

3.1.5. Pricing

The following table was constructed from past data of the company to show a rough indication of the trend of export prices of the decorative ceiling fans to the U.S.A. market :

Sweep	F.O.B. H.K. (US$)			
	Year 1979-80	1981	1982	1983
52"	50-60	45-55	40-50	35-45
42"	45-55	40-50	35-45	30-40

Table 5. F.O.B. Prices of Decorative Ceiling Fans to the U.S.A. Market (1979-83).

The following two methods are to be used to work out at rough estimate of a reasonable price for the new product.

A. "Additional of Utilities" Approach

Since the ceiling glass fan is a combination of a flushmount decorative ceiling fan and a lighting, its price should be the total price of the two articles, that is :-

	US$
Average F.O.B. price of a flushmount decorative ceiling fan	30.60
Average F.O.B. price of a lighting	30.00
	60.60

B. "Profit Margin" Approach

The following table was constructed from past data of the company to show a rough indication of the average gross profit margins of the decorative ceiling fans to the U.S.A. market :

	Year 1979-80	1981	1982	1983
Gross Profit Margin (%)	40-50	30-35	20-25	10-15

Table 6. Average Gross Profit Margins of Decorative Ceiling Fans to the U.S.A. Market (1979-83)

Although the export price of decorative ceiling fans has been dropping since 1980, the average gross profit margin did not follow decrease in the same proportion because it was also affected by the increasing exchange rate of the U.S. dollar, the reduction in manufacturing costs due to improved production efficiency, cheaper material used and more competitive prices from sub-contractors, etc. The total manufacturing cost of the ceiling glass fan is estimated to be around

US$40.50 [28]. Taking a gross profit margin of 32.5% (average gross profit margin in 1981), the selling price (F.O.B. Hong Kong) will be :

US$40.50 ÷ (1-32.5%) = US$60.00

which is close to the price calculated by "Additional of Utilities" approach above. The average gross profit margin of 1981 is taken because as far as Wing Tat's decorative ceiling fans are considered, 1981 was the first mature year of sales of decorative ceiling fans. In fact, Moss has indicated that they are willing to pay at a price from US$60 to US$65 for the glass fan. Saga [29] has also agree to purchase from US$65 to US$70 which includes the 5% loyalty to Moss.

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[28] Derivation of estimated cost of a ceiling glass fan :-

		HK$
Flushmount Fan		181.14
Glass Centre Band		55.00
4 120V 25W Light Bulbs @1.52		6.08
4 Lampholders @2.12		8.48
4 Wooden Blades with Translucent Glass Insertion @9.83		39.32
Pull Chain Switch for Top Lightings		7.32
Top Mounting Plate		4.92
Lower Decorative Plate		7.40
Others		39.24
		347.90
Less :		
4 Wooden Blades @5.40	HK$21.60	
Upper and Lower Casings @5.20	10.40	32.00
		315.90

(Exchange Rate : US$1.00 = HK$7.80) i.e. US$40.50

[29] Saga is another prominent importer in California buying on behalf of Handyman.

3.1.6. Projection of Selling Prices for the Coming Five Years

Being a type of decorative ceiling fan, it is assumed that the trend of the selling price of the ceiling glass fan will be similar to that of the conventional decorative ceiling fans in the past. However, the situation in 1979 when the conventional decorative fans were introduced to the U.S. market is quite different from the situation in 1983-84. At that time there were only around 20 ceiling fan manufacturers in Hong Kong. But by 1983 there are over 50 of them. The price of the ceiling fan can be kept at a high profit margin in the first year of operation, but will eventually decrease in subsequent years due to competition from other manufacturers who start to come into the market. Previous experience of other products shows design registration cannot obstruct other competitors for coming in particularly from Taiwan where legal proceedings against infringement is simply non-existent.

An estimation of the profit margins for the coming five years is shown in the following table which is calculated on a conservative base taking into account of the possibility that the design registration could somehow prevent competitors from coming into the market at the beginning. It is then taken that the company will face competition after year 2. The selling prices are then calculated from the total manufacturing costs. (See Appendix 14.)

	Year 1	Year 2	Year 3	Year 4	Year 5
Estimated Gross Profit Margin (%)	32.5	30.0	28.0	25.0	20.0
F.O.B. Price (US$)	60.00	57.85	56.25	54.00	50.60

Table 7. Estimation of Gross Profit Margins and F.O.B. Prices of Ceiling Glass Fans to the U.S.A. Market (5 years)

3.1.7. Sales Volume

Until 1983, exports of ceiling fans were included in Electro Mechanical Fans (SITC 775720) in the Hong Kong Trade Statistics (Census & Statistics Department, Hong Kong 1976-1982) together with exports of other fans like wall fans, table fans, floor fans, and ventilating fans. Starting from Jan. 1983, exports of electro mechanical fans are itemized into different types of fans. The following table shows the domestic exports of different types of fans from Hong Kong to U.S.A. in 1983.

Item	Quantity (% of Total)	Value HK$ (% of Total)
SITC 775721: Ceiling Fans Electro Mechanical	4,776,383 (94.7)	1,167,670,604 (99.5)
SITC 775722: Wall Fans Electro Mechanical	0 (0.0)	0 (0.0)
SITC 775723: Table Fans and Floor Fans Electro Mechanical	165,142 (3.3)	4,707,359 (0.4)
SITC 775724: Ventilating Fans Electro Mechanical	174 (0.0)	34,638 (0.0)
SITC 775729: Fans Electro Mechanical N.E.S.	99,972 (2.0)	1,022,002 (0.1)
TOTAL :	5,041,671 (100.0)	1,173,334,603 (100.0)

Table 8. Hong Kong Domestic Exports of Different Types of Fans to U.S.A. (1983)

Source : Hong Kong Trade Statistics (Census & Statistics Department, Hong Kong, 1983)

From the above table, the proportion of the exports of ceiling fans to the U.S.A. in quantity to the total exports of electro mechanical fans in quantity in 1983 is 94.7%. Since there was no breakdown of the total exports of electro mechanical fans before 1983, the Hong Kong domestic exports of ceiling fans to U.S.A. from 1980-1982 are estimated by using this ratio as shown below :

Hong Kong Domestic Exports (in quantity)

Year	Electro Mechanical Fans (1)	Ceiling Fans (Estimates) (2)
1980	2,088,000.	1,977,000.
1981	3,827,000.	3,624,000.
1982	2,956,000	2,799,000

Table 9. Estimated Hong Kong Domestic Exports of Ceiling Fans to U.S.A. (1980-1982)

(1) Source : Hong Kong Trade Statistics (Census & Statistics Department, Hong Kong, 1980-1982)

Estimate in (2) = Figure in (1) x 94.7%

The following table shows the rough figures of sales in quantity of ceiling fans to U.S.A. from Wing Tat and her two subsidiary companies, namely, Fan Tat and Lite Tat from 1980-1983 :

	Wing Tat		Fan Tat	Lite Tat		
year	Decorative Fans	Industrial Fans	Decorative Fans	Decorative Fans	Total	Share of Market(%)
1980	50,000	30,000	-	-	80,000	3.8
1981	85,000	15,000	40,000	-	140,000	3.7
1982	100,000	10,000	30,000	40,000	180,000	6.1
1983	188,000	10,000	50,000	62,000	300,000	6.5

Table 10. Sales of Ceiling Fans (in Quantity) to the U.S.A. Market from Wing Tat Electric Mfg. Co., Ltd. (1980-1983)

Note : Share of Market is calculated against the exports of ceiling fans from Hong Kong to U.S.A. in Appendix 1.

The Sales Volumes of the project are projected in Table 11 below :

Year		1	2	3	4	5
Projected Sales Volume	Quantity [30]	75,000	90,000	108,000	129,000	156,000
	Revenue (US$)	4,500,000	5,206,500	6,075,000	6,966,000	7,893,600

Table 11. Projected Sales of Ceiling Glass Fans to the U.S.A. Market (5 years)

The sales volumes projected in Table 11 are based on the following considerations :

A. To utilize a floor space of about 22,000 sq. ft. It is known from previous experience, a floor area of 22,000 sq. ft. can produce up to 500 sets of decorative fans per working day (assuming 100% productivity).

B. To utilize the existing capacity of the Electro-plating Section, Aluminium Die-casting Section, and Motor Assembly Section, etc. According to the 1983 production capacity analysis, the capacity of these sections is around 300 sets per working day.

C. Wing Tat is experienced in the setting up and management of decorative fans production in the capacity of 200 to 500 sets per working day.

D. The smallest economic production size is about 150 sets per working day. Set-up of production facilities below this capacity will cause under-utilization of some equipment, facilities, moulds, dies, toolings, and manpower due to increased line balancing loss, machine

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[30] It is assumed that there are 300 working days in a year. First year's production capacity is 250 sets of ceiling glass fans per day. The estimated growth rate is 20%p.a.

set-up and tooling change-over time, etc.

E. From past experience, the lead-time required for expansion of production facilities in case there is increased demand for the ceiling glass fan is only about two to three months. It is anticipated in the foreseen future the supply of industrial space will be adequate for the demand from industry and there should be little problem in getting additional factory premises within a few months' time when required. Therefore, the production capacity is in fact quite flexible and can be increased within a short period of time if the market turns out to be more favourable than projected. It is preferable to minimize unnecessary risk and avoid possible loss in setting up a large factory in the initial stage and eventually the market turns out to be not as favourable as projected. Although the setting of several market parameters are based on past experience and historical data of the company, without a solid support from any market research, the proposed plan has to be carefully prepared on a conservative basis to minimize the risk and possible loss. Such a strategy can be treated as a test market approach.

Andrews [31] has pointed out three main reasons for using a test market :

1. To predict national sales from a smaller scale operation;
2. To protect major investment expenditure;
3. To learn about operating in an unfamiliar market on a manageable scale.

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[31] Andrew, 1955. pp. 236-237.

In fact, the above points are considered as the main reasons in taking a test market approach to the approach to the setting of the market parameters, especially in the setting of a small product range and low projected sales volumes for the project.

The sales volumes in Table 11 are projected on a conservative basis of a relatively small scale operation so that it can be assumed that the market can absorb all produced goods from the operation. Furthermore, as mentioned on p.57 above, the operation can be quite easily expanded in a few months' time if the market turns out to be more favourable than projected.

3.2. Technological Aspects

3.2.1. Manufacturing processes

There will be a total of 27 operations in the Ceiling Glass Fan Assembly Section. A Precedence Relationship Diagram showing the sequence of operations and physical locations where operations are carried out is found at Appendix 5 with breakdowns of Motor Assmebly Line and Top Plate Assembly Line at Appendix 7 and 8 respectively.

Description of the various operations and the corresponding standard time are given in Appendix 6 The standard time is mainly obtained by time study using stopwatch and estimation from historical data of similar operations.

Several material parts and processes are to be supplied or carried out in other sections of Wing Tat, for

example, die-castings, motors, electro-platings, wire cutting, press work, etc., to absorb the factory overheads of these facilities and to have higher production efficiencies.

3.2.2. Material Resources

A list of material parts and the corresponding costs are shown in Appendix 9. The costs of materials from local and overseas suppliers are based on price quotations from the suppliers. The costs of processed materials from other sections of Wing Tat are based on the transfer prices which include the prime cost plus absorption of factory overhead.

The breakdown of material costs according to supply is shown below :

From other sections of Wing Tat	US$ 0.94	2.7%
From local vendors	21.40	61.4% [32]
From overseas	12.53	35.9%
	US$34.87	100.0%

3.2.3. Machineries, Factory Facilities, Tools & Dies

A description of machineries, equipment, factory facilities, tools and dies required by the plant is shown at Appendix 10.

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[32] Though 61.4% of the material is to be supplied by local vendors, most of them are excess stock components in common with other decorative ceiling fans. One of the benefits of this new product development is to use up the excess inventory of components. For simplicity sake, they are considered as directly purchased from local vendors.

The list of machineries, factory facilities, tools and dies is based on a capacity of 300 sets of ceiling glass fans a day. Since the average life-time of tools and dies is only about two years, new tools and dies have to be purchased in the third and the fifth year to replace the old tools and dies.

Additional machineries and equipment have to be installed in the third year to increase the maximum production capacity from 300 sets to 520 sets a day.

3.2.4. Plant Layout and Area

A production floor of 22,000 sq. ft. can be spared from Wing Tat for the plant. The layout plan is not included as it is not essential for further study.

3.2.5. Production Output

The daily production output is planned as in Table 12 below :

	Year 1	Year 2	Year 3	Year 4	Year 5
Daily Production (sets)	250	300	360	430	520

Table 12. Planned Daily Production (5 years)

The projected increase is roughly 20% p.a. Increase of production in the second year is achieved by improvement in productivity.

For year 3, 4, and 5, increase of production is achieved through recruitment of additional direct labour and instalation of additional machineries and facilities.

3.3. Production Personnel

The organization chart of production personnel is shown below :

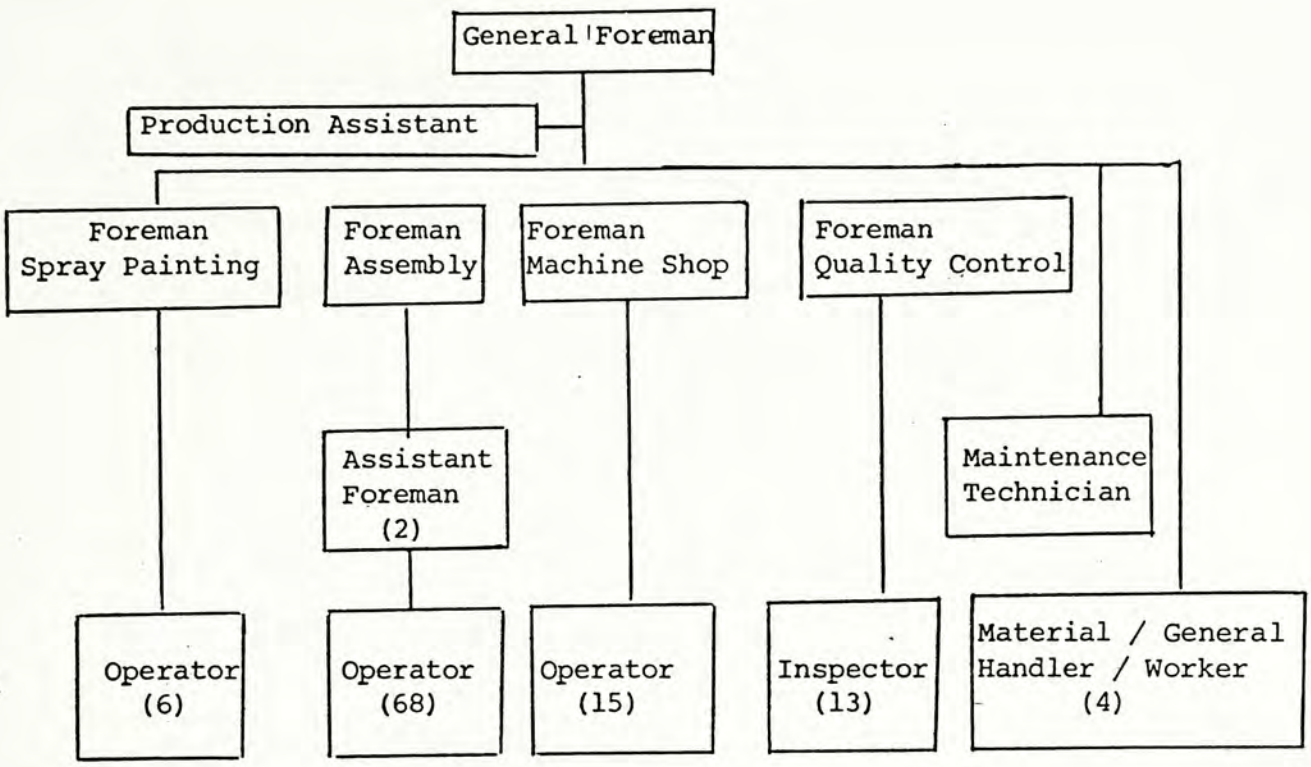

Figure 4. Production Organization Chart

For a brief job description of the personnel, please refer to Appendix 11. Their wages and salaries are shown in Appendix 12.

The direct labour required in each year is shown below :

	year 1	year 2	year 3	year 4	year 5
Productivity (%)	85	100	100	100	100
No. of operators & inspectors	102	102	117	134	154

Table 13. Manpower Requirement & Productivity (5 years)

Productivity is increased from 85% in the first year to 100% in the second year due to the personnel getting more familiar with the manufacturing operations.

3.4. Budgeted Costing and Financial Statement

The budgeted costing and financial statements are prepared and based on the historical data of Wing Tat, information collected, together with some reasonable assumptions. For detail descriptions of those assumptions and business practices, please refer to the notes after each appendix concerned.

3.4.1. Monthly Factory Overhead

The monthly factory overhead for five years are shown in Appendix 13.

3.4.2. Operating Cost

The operating cost per unit for five years are shown in Appendix 14.

The fixed costs of selling expenses and administrative expenses are calculated on the assumption that the Ceiling Glass Fan Section should absorb a proportion of such fixed overheads of Wing Tat. From another point of view, if Wing Tat does not take up this project, she still have to bear basically the same amount of fixed overhead with her normal sales.

However, a proportion of fixed costs of the selling and administrative expenses of Wing Tat are included to get a more conservative projection.

3.4.3. Budgeted Cash Flow

The cash flow by quarters for the first year are shown in Appendix 15. The cash flow for five years are shown in Appendix 16.

3.4.4. Proforma Profit & Loss and Appropriation

The proforma profit & loss and appropriation for five years are shown in Appendix 17.

The net profit after tax and the net cash generated in each year are shown in Table 14 below.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net Profit after tax (US$)	1,034,794	1,001,261	924,291	689,490	170,042
Net cash Generated (US$)	380,000	1,000,000	800,000	600,000	60,000

Table 14. Net Profit and Net Cash Generated (5 years)

3.4.5. Balance Sheet

The balance sheet for five years end are shown in Appendix 18.

3.4.6. Initial investment

Maximum cash requirement occurs at the end of the first quarter after commencement of the project :

	US$	
Total inventories	397,354	
Prepaid rent	10,120	
Prepaid insurance	2,136	
Accounts receivable	90,000[a]	
Cash	56,312	
Current Assets		555,922
Less		
Accrued water & electricity charges	800	
Accounts payable	133,750[b]	
Current Liabilities		134,550
Working Capital		421,372
Plus		
Machineries & equipment	49,650	
Factory facilities	20,000	
Tools & dies	27,510	
	97,160	
Less		
Depreciation	3,439	
Fixed Assets		93,721
Less		
Non-recoverable expenses incurred during implementation stage		34,907
TOTAL INITIAL INVESTMENT		550,000

Note : a. 6 days' finished goods (1 week) were shipped in the first quarter.

b. To pay for one month's local merchandise.

The total initial investment of US$550,000 will be financed by overdraft and other banking facilities of Wing Tat such as L/C's and T/R's etc. The financing and repayment schedule is shown as below :

	US$		
Quarter	Bank financing (at beginning)	Repayment (at end)	Interest payment[a] (at end)
1	550,000	-	-
2	-	300,000	16,500
3	-	250,000	7,500
4	-	-	-
	550,000	550,000	24,000

Note : The above schedule is constructed on a quarterly basis for the sake of simplicity.

a. Interest - 12% per annum.

3.5. Implementation Schedule

A simplified implementation schedule for the initial stage of the project is shown below :

Activities	Month 1	2	3	4
Recruitment				
Production staff				
Labour & inspectors				
Purchase of machineries, tools & dies				
Installation of factory facilities				
Purchase of raw materials				
Pilot production run				
Normal production.				

CHAPTER IV

ANALYSIS OF RESULTS

4.1. Financial Analysis

The financial returns of the project to some extent depend on the method of financing. Since Wing Tat is not prepared to issue any new shares, nor does she have any excess cash on hand, the project will probably be financed by bank overdrafts and other banking facilities (e.g. L/C's & T/R's, etc.) of Wing Tat, which are now in excess.

For the sake of comparision, cash flows of the project are analysed in both cases, that is :

A. Project to be financed by bank overdrafts and other banking facilities of Wing Tat.

B. Project to be financed by an initial investment outlay from Wing Tat.

4.1.1. Cash Flows of the Project Financed by Banking Facilities (US$)

Year	Initial investment outlay	Cash generated from project	Net equity of project at end of 5th yr.	Net gain/(loss)	Discount factor	Present value
0	-	-	-	-	1.000	-
1	-	380,000	-	380,000	0.833	316,540
2	-	1,000,000	-	1,000,000	0.694	694,000
3	-	800,000	-	800,000	0.579	463,200
4	-	600,000	-	600,000	0.482	289,200
5	-	60,000	-	60,000	0.402	24,120
	-	2,840,000	-	2,840,000		1,787,060

Note : The discount rate is 20% per annum.

Table 15. Cash Flows of the Project Financed by Banking Facilities (US$)

4.1.2. Cash Flows of the Project Financed by Initial Investment Outlay (US$)

Year	Cash generated from project (1) (bank financing)	Interest payment to bank (2)	Tax reduction due to interest expenses (3)	Cash generated from project (1)+(2)-(3) (investment outlay)
0	-	-	-	-
1	930,000	24,000	3,960	950,040
2	1,000,000	-	-	1,000,000
3	800,000	-	-	800,000
4	600,000	-	-	600,000
5	60,000			60,000
	3,390,000	24,000	3,960	3,410,040

Year	Initial investment outlay	Cash generated from project	Net equity of project at end of 5th yr.	Net gain/(loss)	Discount factor	Present value
0	550,000	-	-	(550,000)	1.000	(550,000)
1	-	950,040	-	950,040	0.833	791,383
2	-	1,000,000	-	1,000,000	0.694	694,000
3	-	800,000	-	800,000	0.579	463,200
4	-	600,000	-	600,000	0.482	289,200
5	-	60,000	-	60,000	0.402	24,120
	550,000	3,410,040	-	2,860,040		1,711,903

Note : The discount rate is 20% per annum.

Table 16. Cash Flows of the Project Financed by Initial Investment Outlay (US$)

4.1.3. Net Present Value

	Banking financing	Investment outlay
Net present value (5 years)	US$1,787,060	US$1,711,903

Table 17. Net Present Value

4.1.4. Return on Investment

The accounting rate of return on investment (5 years average) $= \frac{2,860,040}{5 \times 550,000} \times 100\% = 104.0\%$

Year	Net cash flow of project In/(out)	Discount factor	Present value
0	(550,000)	1.000	(550,000)
1	950,040	0.404	383,816
2	1,000,000	0.163	163,000
3	800,000	0.066	52,800
4	600,000	0.027	16,200
5	60,000	0.011	660
	2,860,040		66,476

Note : The above method of calculation of return on investment cannot be applied to the cash flows of the project totally financed by banking facilities.

4.1.5. Payback Period

$$\text{Payback period} = \frac{550,000}{950,040} \times 12 \text{ months}$$

$$= 6.9 \text{ months}$$

Note : The above method of calculation cannot be applied to the cash flows of the project totally financed by banking facilities.

4.2. Risk Analysis

The initial investment for the project is US$550,000 and the non-recoverable expenses incurred during the implementation stage of the project is US$34,907. Therefore as a rough indicator of the risk involved in the "go" or "no-go" decision of the project, if the project turns out to be not as favourable as projected after the implementation stage, the incurred loss will be US$34,907 and the capital tied up will be US$515,093. The following are further discussion on this topic from other points of view :

4.2.1. Break-even Analysis

Variable cost per unit (US$)	Year 1	Year 2	Year 3	Year 4	Year 5
Direct material cost	34.87	36.61	38.44	40.37	42.38
Direct labour cost	4.16	3.82	3.50	3.22	2.93
Indirect material cost	0.19	0.17	0.15	0.13	0.11
Water & electricity charges	0.13	0.12	0.11	0.10	0.09
Variable selling expenses	0.10	0.11	0.11	0.12	0.12
L/C opening charges	0.03	0.03	0.03	0.03	0.04
Total variable cost per unit	39.48	40.86	42.34	43.97	45.67

Table 18. Variable Cost per Unit (US$) (5 years)

Fixed cost per annum (US$)	Year 1	Year 2	Year 3	Year 4	Year 5
Indirect labour	12,240	13,464	14,808	16,296	17,928
Rent & rates	60,720	66,792	73,476	80,820	88,908
Production staff salaries	37,200	41,664	46,668	52,260	58,536
Insurance	2,136	2,340	2,556	2,820	3,096
Maintenance	3,600	3,780	3,960	4,164	4,380
Miscellaneous factory overhead	2,400	2,520	2,652	2,784	2,916
Factory depreciation	23,688	23,688	30,684	30,684	38,448
Fixed selling expenses	22,500	28,800	35,640	45,150	56,160
Administrative expenses	90,000	113,400	142,500	179,310	227,760
Interest payment	45,144	33,697	42,441	53,480	67,555
Total fixed cost per annum	299,628	330,145	395,445	467,768	565,687

Table 19. Fixed Cost per Annum (US$) (5 years)

	Year 1	Year 2	Year 3	Year 4	Year 5
Project Selling Price per unit (US$)	60.00	57.85	56.25	54.00	50.60
Projected Sales per Annum : Quantity(sets)	75,000	90,000	108,000	129,000	156,000
: Revenue(US$)	4,500,000	5,206,500	6,075,000	6,966,000	7,893,600
Break-Even Selling Price per unit (US$)	43.48	44.53	46.00	47.60	49.30
Break-Even Sales Volume per Annum : Quantity (sets)	14,602	19,432	28,429	46,637	114,744
: Revenue (US$)	876,120	1,124,141	1,599,131	2,518,398	5,806,046
Break-Even Production per Working Day (sets)	49	65	95	155	382
Percentage of Projected Production (%)	19.6	21.7	26.4	36.0	73.5

Note : (1) Break-Even Selling Price per unit

$$= \frac{\text{Total Fixed Cost per Annum}}{\text{Projected Sales Quantity per Annum}} + \text{Total Variable Cost per Unit}$$

(2) Break-Even Quantity per Annum

$$= \frac{\text{Total Fixed Cost per Annum}}{\text{Projected Selling Price per Unit - Total Variable Cost per Unit}}$$

The break-even quantity is very low from Year 1 to Year 4, but is considered to be rapidly closer to the projected quantity in Year 5. The project should be reviewed periodically with special caution on the forecast of sales volume after the fifth year.

4.2.2. Current Ratio Analysis

	1st Year End	2nd Year End	3rd Year End	4th Year End	5th Year End
Current Assets (US$)	924,349	981,524	1,105,243	1,238,496	1,322,061
Current Liabilities (US$)	134,550	169,405	213,278	267,343	339,301
Current Ratio	6.9	5.8	5.2	4.6	3.9

The current ratio stays around 6.9 to 3.9 within the five years. This indicates a moderate financial risk and in case of termination of this project, the current liabilities will be covered by the current assets. As the ratio drops down to 3.9, it will be very risky if the project continues beyond the fifth year.

4.2.3. Product Liability

Household products sold in the states are fully liable for any damages during usage arising from any functional, design, or quality problems of the product. The responsibility can be traced from the selling agents to overseas manufacturers, and even to sub-contractors. Damages involving hurts or losses of life are considered

most serious and suits for substantial compensations have been won in many cases.

Product liability insurances are available to manufacturers who can show evidence of satisfactory design and quality control of their products. The premium for electrical products similar to the ceiling glass fan is around 0.80 per thousand of annual sales revenue.[33]

The annual premium for each year is calculated and shown in the following table :

	Year 1	Year 2	Year 3	Year 4	Year 5
Annual Premium (US$)	3,600	4,165	4,860	5,573	6,315

Table 20. Annual Premium for Product Liability (5 years)

4.2.4. Claims from Customers

Possibility of claims and returned goods from customers due to quality problems is another important factor of risk the manufacturer has to take.

Major steps which can be taken to minimize claims and returned goods from customers are :

A. Set-up of an effective quality control system in the factory. The ratio of inspectors to direct labour is to be kept at 1: 6.8 which is considered adequate for manufacturing operations of similar types.

B. Explicit after-sales terms and negotiation for a reasonable acceptable quality level with customers.

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[33] Quoted by First State Insurance Co., Wilmington, Delaware, U.S.A. on 1st July, 1983.

4.2.5. Other Uncontrollable Factors

Other uncontrollable factors of risk include fluctuations of exchange rates, interest rate, price of materials, wages & salaries, rent, and other factory, selling and administrative expenses.

The following is a summary of anticipated changes of these factors :

Exchange rate	US$1 = HK$8.00
Interest rate	12% per annum
Prices of materials, water & electricity, maintenance, miscellaneous, selling & administrative expenses	5% increase per annum
Prices of rent and labour	10% increase per annum
Production staff salaries	15% increase per annum

Table 21. Summary of Anticipated Changes of Uncontrollable Factors.

Safety margins have been taken in the projection of these factors. For comparision purposes, current exchange rate is US$1 to HK$7.80 and current prime rate in Hong Kong is 10.0 per annum.

4.3. Qualitative Analysis

4.3.1. Potential for New Product Market Developments

By the implementation of the project, Wing Tat can build up a goodwill as a developer and sole manufacturer of the electric ceiling glass fan.

Furthermore, if the patent application of the new product by Moss Mfg., Inc. turns out to be successful, Wing Tat will be in a commanding situation, facing no immediate

competition in the market for a relatively longer period of time. The project is a co-operation between a Hong Kong manufacturer and a U.S. importer. The U.S. importer, being in the market is always in a better position in marketing new products.

With the permission from the originator by paying loyalty, Wing Tat is in a favourable position to diversify into other potential markets like Australia and some European countries. Australia has emerged as Hong Kong's third largest market for ceiling fan exports since 1980 and the decorative ceiling fans have started to become more popular in this market. Another important characteristic of the Australian market is her geographical location in the Southern Hemisphere which helps to balance out any seasonal demand fluctuation.

The European market has not been explored with conventional ceiling fans. With the additional function of lighting to the conventional decorative ceiling fan, this part of the world can become a potential market for the product.

Obviously, Canada should be a potential market next to the U.S., although the demand will be probably around 5% of that of the U.S. market.

Other features like remote-controls, suitability for low ceiling application, a smaller sweep of 42" suitable for smaller rooms, and different appearances and styles may be introduced from time to time.

Apart from technical aspects, the project can serve as a foundation for the future development of Wing Tat, especially in related fields of business. This includes established business relations, connections, market knowledge, distribution channels, and financial supports, etc.

4.3.2. Utilization of Excess Capacity, Facilities and Resources

This includes the making use of the presently idled floor space of 22,000 sq. ft., supplies of parts from some under-capacity sections of Wing Tat like the Electro-plating Section, the Motor Assembly Section, the Aluminium Die-casting Section, and the Press Section, etc.

Taking a proportion of 5% being factory overhead, the total factory overhead of these sections being absorbed by the project is shown as below :

	Year 1	Year 2	Year 3	Year 4	Year 5
Material from other sections (US$)	70,500	89,100	112,320	140,610	177,840
Factory overhead absorbed (US$)	3,525	4,455	5,616	7,031	8,892

Table 22. Factory Overhead of Other Sections of Wing Tat Absorbed by the Project (5 years)

Other excess resources like common component parts with conventional decorative fans in stock and redundant workers of Wing Tat can also be taken up by the project in the early stage.

4.3.3. Absorption of Fixed Overheads of Selling & Administrative Expenses

The absorption of fixed overheads of the selling and administrative expenses of Wing Tat is calculated and shown in the following table.

	Year 1	Year 2	Year 3	Year 4	Year 5
Selling expenses (US$)	30,000	38,700	47,520	60,630	74,880
Administrative expenses (US$)	90,000	113,400	142,560	179,310	227,760
Total (US$)	120,000	152,100	190,080	239,940	302,640

Table 23. Absorption of Fixed Overheads of the Selling & Administrative Expenses of Wing Tat by the Project (5 years)

CHAPTER V

CONCLUSION

5.1. Summary of Results

A summary of results and the corresponding evaluations are shown in the following table :

Objectives	Analysis of results	Evaluation
1. Maximum financial return	1.1 Net present value....US$1,787,060 1.2 Accounting return on investment.....104.0% 1.3 Payback period.....6.9 months	High financial return
2. Minimum risk	2.1 Loss in initial stage.....US$34,907 Break-even quantity of 1st year.....19.6% 2.2 Current ratio.....6.9 to 3.9 2.3 Product liability covered by insurance 2.4 Customer claims - explicit after-sales terms and effective Q.C. system 2.6 Other uncontrollable factors-adequate safety margin	Moderate level of risk
3. Potential for product market develop-ments	3.1 Sole supplier to the U.S. market at least at the initial stage 3.2 Developer of the new product 3.3 Patent right covered by trading partner 3.4 Market diversification - Australia, Europe, Canada 3.5 New product features 3.6 Foundation for further develop-ment	High potential for expansion and further development
4. Utilization of excess capacity, facilities, & resources	4.1 Floor space of 22,000 sq. ft. absorption of rent 1st yr..... US$60,720 4.2 Absorption of factory overhead of other sections 1st yr..... US$3,525 4.3 Absorption of fixed overheads of selling & administrative expenses 1st yr. US$120,000 4.4 Absorption of material over-stock and redundant workers	A good solution to excess resources of the company

Table 24 Summary of Results

According to the evaluation in Table 24 above, the project is considered to yield high financial return with moderate level of risk having high potential for further expansion and development, and is a good solution and opportunity to solve the under-capacity problem of the company.

In other words, all objectives as discussed in Section 2.4 of Chapter II can be met by the proposed project, which is therefore recommended to the company for acceptance.

5.2. Cautions and Recommendations

There are some other points which worth consideration apart from those already discussed in previous sections.

5.2.1. Limitation of the Study

Although the study has covered most of the major factors of the project, care must be always taken to control occurrences of unfavourable situations arising from other factors not thoroughly considered in this study. As an example, it is the usual practice to have L/C 30 days payment terms for exports of ceiling fans to the U.S. market as assumed in this study. Therefore management must be very careful in consideration of accepting other terms of payment from customers upon request because this will affect the financial situation and cash flows of the company.

Application for product listing with the Underwriters Laboratories (U.S.A.), should be proceeded by the Engineering Department parallel to the development of the project. The U.L. listing normally takes four to five weeks after submission of samples. This is considered

as a quality proof in promoting the product and reducing the risk of product liabilities. The cost of testing is normally around US$2,000.

5.2.2. Long-term Profitability

Although the project is yielding high earnings in the first few years (31.3% in the first year), the profit is decreasing year after year and approaching a near break-even in the fifth year (7.3%). This is due to the assumption of decreasing gross profit margin from 32.5% in the first year to 20% in the fifth year. The assumption is conservative, however, a wide safety margin has been provided.

In order to improve the depression situation probably five years after, the business situation must be reviewed from time to time so that corrective measures can be taken in advance. For example, introduction of new product features may improve the gross profit margin. Cost reduction projects of design, material, and automation of manufacturing processes should be carried out on a continuous basis as well.

5.2.3. Political and Socio-economic Changes

A thorough discussion of this topic is beyond the scope of this report as it is so vague and will take quite a lot of time and effort to obtain a picture of the situation, and yet it may not tell the actual happenings in future.

This factor is therefore left for the Board of Directors to consider. It will be the Board's decision whether to collect more information about the topic or to make a fair judgement right away.

5.3. Conclusion

It has to be admitted that this report has not covered all aspects for a feasibility study of the introduction of electric ceiling glass fans to the U.S.A. market.

The main emphasis has been placed on the quantitative analysis, on those situations which are relatively easy to be formulated, on the basis of a medium-term planning with the assumption that there will be no violent changes of the environment in that time span.

This report however, does show quite a clear picture of the situation from certain angles of view. The proposal leaves a fairly high degree of flexibility in both ways - expansion and contraction. Quick pay back and high liquidity indicate a high flexibility for contraction in unfavourable situations. A relatively small-sized, but economic operation enables rapid expansion by partial or complete duplication of the operation in favourable situations.

To re-state the conclusion of the study, the recommendation of this report is to accept the proposed project on the introduction of an electric ceiling glass fan to the U.S.A. market.

In addition, the report can serve as a memorandum for the implementation of the project, especially during the initial stage. It is also quite a good piece of information for other concerned parties like the bankers as a reference for their consideration.

Finally but not the least, the formulation of this feasibility study and its ultimate implementation would provide the necessary stimulus and motivation to members of the company's engineering and production departments for the further exploration of new product development and diversification.

APPENDIX 1

HONG KONG DOMESTIC EXPORTS OF ELECTRO MECHANICAL FANS,1976-83

— By Major Markets —

Value : HK$ '000
Quantity (in brackets) : '000 units

Markets/Ranking (Based on 1981 figures of VALUE)	1976 a		1977 a		1978 b		1979 b		1980 b		1981 b		1982 b		1983 c		% Change						
	Value (Qty.)	% Share	Value (Qty.)	% Share	Value (Qty.)	% Share	Value (Qty.)	% Share	Value (Qty.)	% Share	Value (Qty.)	% Share	Value (Qty.)	% Share	Value (Qty.)	% Share	77/76	78/77	79/78	80/79	81/80	82/81	83/82
World	82,637 (781)	100.0 (100.0)	121,690 (1,102)	100.0 (100.0)	152,176 (1,367)	100.0 (100.0)	274,950 (2,004)	100.0 (100.0)	656,901 (3,501)	100.0 (100.0)	1,277,829 (5,590)	100.0 (100.0)	927,588 (4,250)	100.0 (100.0)	1,430,677 (6,306)	100.0 (100.0)	+ 47 (+ 41)	+ 25 (+ 24)	+ 81 (+ 47)	+139 (+ 75)	+ 95 (+ 60)	-27 (-24)	+54 (+48)
1. U.S.A.	4,634 (42)	5.6 (5.4)	9,134 (80)	7.5 (7.3)	17,235 (149)	11.3 (10.9)	91,285 (562)	33.2 (28.0)	468,245 (2,088)	71.3 (59.6)	999,800 (3,827)	78.2 (68.5)	731,921 (2,956)	78.9 (69.6)	1,167,571 (4,776)	81.6 (75.7)	+ 97 (+ 90)	+ 89 (+ 86)	+430 (+277)	+413 (+272)	+114 (+ 83)	-27 (-13)	+60 (+62)
2. Saudi Arabia	17,887 (162)	21.6 (20.7)	45,167 (380)	37.1 (34.5)	72,011 (607)	47.3 (44.4)	77,069 (571)	28.0 (28.5)	64,535 (464)	9.8 (13.3)	109,525 (689)	8.6 (12.3)	67,608 (430)	7.3 (10.1)	97,194 (529)	6.8 (8.4)	+153 (+135)	+ 59 (+ 60)	+ 7 (- 6)	- 16 (- 19)	+ 70 (+ 48)	-38 (-38)	+44 (+23)
3. Australia	2,379 (19)	2.9 (2.4)	2,287 (18)	1.9 (1.6)	3,409 (30)	2.2 (2.2)	14,453 (121)	5.3 (6.0)	36,351 (259)	5.5 (7.4)	69,447 (413)	5.4 (7.4)	40,978 (267)	4.4 (6.3)	44,404 (281)	3.1 (4.5)	- 4 (- 5)	+ 49 (+ 67)	+324 (+303)	+152 (+114)	+ 91 (+ 59)	-41 (-35)	+ 8 (+ 5)
4. Canada	2,040 (16)	2.5 (2.0)	2,471 (23)	2.0 (2.1)	6,907 (64)	4.5 (4.7)	22,214 (148)	8.1 (7.4)	15,469 (93)	2.4 (2.7)	20,627 (101)	1.6 (1.8)	20,434 (107)	2.2 (2.5)	27,396 (123)	1.9 (2.0)	+ 21 (+ 44)	+180 (+178)	+222 (+131)	- 30 (- 37)	+ 33 (+ 9)	- 1 (+ 6)	+34 (+15)
5. United Arab Emirates	14,473 (150)	17.5 (19.2)	12,427 (123)	9.4 (11.2)	8,293 (80)	5.4 (5.9)	14,479 (132)	5.3 (6.6)	15,932 (144)	2.4 (4.1)	14,420 (116)	1.1 (2.1)	13,448 (94)	1.4 (12.2)	24,022 (150)	1.7 (2.4)	- 21 (- 18)	- 27 (- 35)	+ 75 (+ 65)	+ 10 (+ 9)	- 9 (- 19)	- 7 (-19)	+79 (+60)

Source : Hong Kong Trade Statistics, Census & Statistics Department, Hong Kong. December issues, 1976-83.

a. 1976-77, SITC 725034 : Fans Electric (n.e.s.)
b. 1978-82, SITC 775720 : Domestic Electro Mechanical Fan
c. 1983, SITC 775721 : Electro Mechanical Ceiling Fans (98.5%)
SITC 775722 : Electro Mechanical Wall Fans (0.1%)
SITC 775723 : Electro Mechanical Table and Floor Fans (0.7%)
SITC 775724 : Electro Mechanical Ventilation Fans (0.4%)
SITC 775729 : Electro Mechanical n.e.s. Fans (0.3%)

NB. SITC : Standard International Trade Classification
n.e.s. : Not elsewhere specified

APPENDIX 2

LIST OF LEADING CEILING FAN MANUFACTURERS IN HONG KONG IN 1983 WITH EMPLOYMENT CODE

	Name of Manufacturer	Employment Code
i)	Antica Fan Co., Ltd.	05
ii)	Carib Electrical Fans Mfg. Ltd.	05
iii)	Cheung Hing Electrical Mfg. Co., Ltd.	05
iv)	China Cold Storage & Engineering Co., Ltd.	06
v)	Deluxe Electric Mfg. Co., Ltd.	03
vi)	Din Wai Electric Mfg. Co., Ltd.	06
vii)	Evergo Electric Mfg. Co., Ltd.	07
viii)	Fan East Electrical Mfg. Co., Ltd.	06
ix)	Fan Tat Mfg. Co., Ltd.	06
x)	Golden Fan Electrical Mfg. Co., Ltd.	05
xi)	Lite Tat Mfg. Co., Ltd.	04
xii)	Loyal Electrical Mfg. Co., Ltd.	05
xiii)	New Fan Manufactory Ltd.	06
xiv)	Safer Electrical Mfg. Co., (F.E.) Ltd.	06
xv)	Shell Electric Mfg. Co., Ltd.	08
xvi)	Super Electrical Mfg. Co., Ltd.	04
xvii)	Tai Wah Hong Electric Mfg. Fty.	04
xviii)	Tyeb Electrical Mfg. Co., Ltd.	05
ixx)	Union Ngok Kee Electrical Manufactory Ltd.	05
xx)	Venton Mfg. Co., Ltd.	04
xxi)	Wellcome Electrical Mfg. Co., Ltd.	04
xxii)	Winfull Fan Mfg. Ltd.	05
xxiii)	Winco Fan Mfg. Co., Ltd.	05
xxiv)	Wing Tat Electric Mfg. Co., Ltd.	07

Source : EXPORT HONG KONG : Buyers' Guide to Hong Kong Industries. Associated Publication Company, 1983. pp. 386-387.

Note :

Employment Code	No. of Employees
01	1 - 9
02	10 - 19
03	20 - 49
04	50 - 99
05	100 - 199
06	200 - 499
07	500 - 999
08	1,000 and over

Source : EXPORT HONG KONG : Buyers' Guide to Hong Kong Industries, Associated Publication Company, 1983. p.27.

APPENDIX 3

HONG KONG DOMESTIC EXPORTS OF ELECTRO MECHANICAL FANS TO THE U.S. MARKET, IN VALUE AND QUANTITY, 1980-83

Value : HK$ '000
Quantity (in brackets) : '000 units

Year / Month	1980 [a]	1981 [a]	1982 [a]	1983 [b]
January	15,085 (81)	68,362 (291)	70,505 (259)	64,373 (256)
February	19,518 (95)	36,352 (150)	79,738 (312)	53,980 (234)
March	21,922 (99)	79,035 (334)	96,110 (359)	88,259 (366)
April	31,136 (150)	97,178 (400)	116,623 (448)	125,411 (511)
May	45,777 (187)	123,414 (495)	121,060 (494)	132,284 (547)
June	49,818 (211)	126,106 (490)	81,889 (320)	121,994 (486)
July	54,711 (230)	121,041 (447)	54,121 (217)	105,729 (436)
August	56,132 (265)	117,213 (417)	23,636 (104)	92,669 (389)
September	42,123 (201)	80,512 (271)	14,826 (64)	85,193 (353)
October	35,661 (163)	54,755 (196)	11,132 (43)	102,822 (435)
November	40,035 (173)	43,348 (155)	21,312 (100)	81,199 (315)
December	56,720 (235)	52,632 (182)	42,424 (241)	113,657 (449)
Total	468,245 (2,088)	999,800 (3,827)	731,921 (2,956)	1,167,571 (4,776)

Source : Hong Kong Trade Statistics, Exports and Re-exports, 1980-83.

a. SITC 775720
b. SITC 775721

APPENDIX 4

UNIT F.O.B. PRICE OF HONG KONG DOMESTIC EXPORT OF ELECTRO MECHANICAL FANS TO THE U.S. MARKET, 1980-83

Value : HK$ '000
Quantity : '000 units

	1980	1981	1982	1983
Value[a] (HK$)	468,245	999,800	731,921	1,167,571
Quantity (Units)	2,088	3,827	2,956	4,777
F.O.B. Unit Price (HK$)	224.28	261.24	247.60	244.45
Exchange Rate[b] of US$1.00	5.10	5.70	6.50	7.80
F.O.B. Unit Price (US$)	43.98	45.83	38.09	31.34

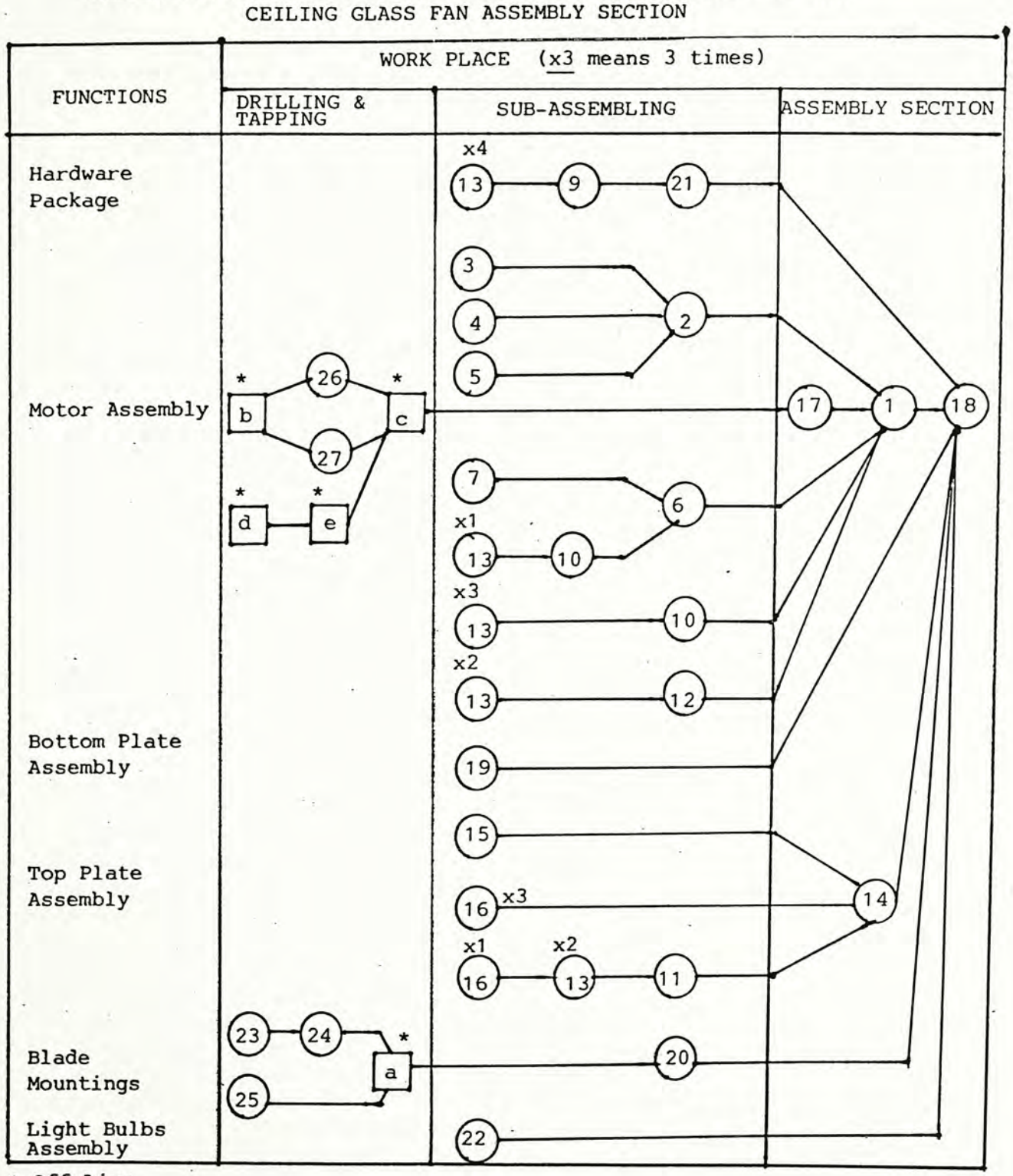
Source : Hong Kong Trade Statistics, Exports and Re-exports, 1980-83.

a. The export value does not include lightings of decorative ceiling fans. Manufacturers in Hong Kong normally sell fans only. U.S. importers buy lightings directly from Taiwan.

b. Hong Kong Annual Reports, 1980-83.

APPENDIX 5

PRECEDENCE RELATIONSHIP DIAGRAM OF THE 27 OPERATIONS OF THE CEILING GLASS FAN ASSEMBLY SECTION



* Off Line Operations

	Description	Work Place
a	Electroplating	Electroplating Section
b	Turning of Lower Motor Housing	Lathe Section
c	Motor Assembly Line	Assembly Section
d	Turning of Upper Motor Housing	Lathe Section
e	Drilling & Tapping of Upper Motor Housing	Lathe Section

Please refer to Appendix 6 for description of Operation 1-27.

APPENDIX 6

OPERATION CHART

Operation	Description	Standard Daily Output			Standard Time (min.)
		Output (pcs.)	No. of Operators	No. of Hours	
1	Motor Assembly line[a]	350	9	9	13.89
2	Switch housing sub-assembly line	765	4	9	2.82
3	Insert wires into PC1691 switch	1023	1	8	0.47
4	Insert wires into PC1689 switch	791	1	6	0.46
5	Solder wires and assemble tubes to slide switch	1488	6	8	1.94
6	Sub-assemble mounting bracket	433	2	6	1.66
7	Connect 2 solderless terminals to a ground wire	720	1	6	0.50
8	Connect 1 solderless terminal to a ground wire	1480	1	6	0.24
9	Insert 4 wires (with connector at end) into a 4-pos plug	1186	1	8	0.40
10	Insert 3 wires (with connector at end) into a 4-pos socket	1492	1	8	0.32
11	Insert 2 wires (with connector at end) of a lampholder into a 2-pos socket	1454	1	6	0.25
12	Insert 2 wires (with connector at end) into a 2-pos plug	1384	1	6	0.26
13	Crimp a metal connector onto a wire end	9216 shots	1	8	0.05
14	Top plate assembly line[b]	153	5	8	15.69
15	Assemble decorative top ring	550	2	9	1.96
16	Stamp UL mark on one lampholder	1555	1	6	0.23
17	Motor balancing	127	1	9	4.25
18	Final packing of the whole fan	350	8	9	12.34
19	Lower plate assembly	156	4	8	12.31
20	Blade mounting assembly	600	6	8	4.80
21	Hardware package	288	1	6	1.25
22	Light bulbs testing and packing	869	4	8	2.21
23	Blade mounting : Drill 2 holes	1225	1	9	0.44
24	Blade mounting : Counterbore 2 holes	2240	1	9	0.24
25	Blade mounting : Tap 3 holes	1872	1	9	0.29
26	Upper motor housing : Drill and tap 3 holes	711	1	9	0.76
27	Lower motor housing : Drill and tap 8 holes	1272	1	9	0.42
		Total :	67		80.45 min.

[a] See Appendix 7 for breakdown of Motor Assembly Line

[b] See Appendix 8 for breakdown of Top Plate Assembly Line

APPENDIX 7

BREAKDOWN OF MOTOR ASSEMBLY LINE

Work Station No.	Work Contents	No. of Operators
1	1. Assemble 3/8" Hex. Nut, Fire-retarding Cover, Mounting Bracket Sub-assembly, Plain Washer & 3/8" Hex. Nut x 10 mm thick, Lock tight 2. Turnover Motor 3. Assemble 3/8" Hex. Nut for Switch Housing	1
2	1. Assemble Tooth Washer, Switch Housing Sub-assembly 2. Lock tight	1
3	1. Insert lead wires from 4-pos socket & 2-pos plug through Shaft 2. Connect 2 Capacitors 3. Connect Wires	3
4	1. Test the PC1689 switch 2. Assemble the Fiber Cover & stick 2 labels 3. Assemble 2 Wire Nut Connectors	1
5	1. Dress up Capacitors & Wires 2. Assemble Switch Housing Cover & Light Adaptor Hole Screw	1
6	1. Test the Motor 2. Stick FOR TOP LIGHT CONNECTION Label	1

No. of Work Stations = 6
No. of Operators = 8
Balancing Loss = 12.934%
Standard Output (T.A. = 25%/9 hrs.) = 350.27 per line

Note : An additional operator is required at the beginning of the line for the re-tapping of the eight blade mounting screw holes.

APPENDIX 8

BREAKDOWN OF TOP PLATE ASSEMBLY ASSEMBLING

Work Station No.	Work Contents	No. of Operators
1	1. Assemble 4 M6 Plain Washers & 8 M6 Hex. Nuts 2. Assemble 3 M4 Spring Washers & 4 M4 Cap. Nuts 3. (UL) Label & Pat. Pending Label	1
2	1. Assemble 4 Lamp Sockets by 8 Hex. Nuts 2. (⏚) Label & (H-9) Label	1
3	1. Connect Wires of the 4 Lampholders 2. Stick 'Red' Label	1
4	1. Test the 4 Lamp Sockets 2. Tie the loose Wires of the Lamp Sockets by 3 Cable Ties; cut the excess parts of the Cable Ties 3. Assemble the Ground Washer & the Ground Screw 4. 4 [Relamp] Labels	1
5	1. Inspect the Top Decor. Ring; remove its protective film; assemble it to the top plate 2. Stick 4 Rubber Cushions on the rim of the Top Ring 3. [FOR TOP LIGHT CONNECTION] Label	1

:: No. of Work Stations = 5
No. of Operators = 5
Balancing Loss = 3.21%
Standard Output (T.A. = 25%/8 hrs.) = 153.4 per line

APPENDIX 9

MATERIAL COST

(1) From other sections of Wing Tat

Component	Material	Specification	Qty. Rqd.	Unit Cost (HK$)	Material Cost (HK$)
Fibre Sheet	Fibre		4 (1 gm.)	6.80/lb.	0.15
Mounting Cover	M.S.		1	4.918	4.92
Electric wire	PVC	1430 AWG 18, 6"	3	0.112/ft.	0.17
Electric wire	PVC	1430 AWG 18, 17"	3	0.112/ft.	0.48
Electric Wire	PVC	1430 AWG 18, 10"	9	0.112/ft.	0.84
Electric wire	PVC	1430 AWG 18, 15"	2	0.112/ft.	0.28
Electric wire	PVC	1430 AWG 18, 9"	1	0.112/ft.	0.08
Electric wire	PVC	1015 AWG 18, 5"	2	0.10/ft.	0.08
Electric wire	PVC	1015 AWG 22, 4½"	9	0.06/ft.	0.02
Electric wire	PVC	1015 Awg 22, 14"	3	0.06/ft.	0.21
Film sheet			3.4 gm.	34.22/kg.	0.12
				Sub-total :	HK$7.35 (US$0.94)

(2) From Local Vendors

Component	Material	Specification	Qty. Rqd.	Unit Cost (HK$)	Material Cost (HK$)
Mounting Bracket cover	M.S.		4	1.30	5.20
Mounting Bracket	M.S.		1	1.70	1.70
Eyelet	Brass		2	0.013	0.03
Rubber tape	Rubber	25 x 5 x 4mm thk.	8	0.022	0.18
J. Hook	M.S.	d. = 5mm	1	0.24	0.24
Glass Band	Glass		1	55.00	55.00
Stud	M.S.	M6 x 127mm lg.	3	0.06	0.18
Lower Cover	M.S.		1	7.40	7.40
Blade Arm	Zinc alloy	Long type	4	3.10	12.40
Knob	Al.		2	0.58	1.16
Switch Housing	M.S.		1	3.05	3.05
Round Nut	Brass	Tap NPS 1/8"-27	4	0.65	2.60
Black Cloth			4	0.50	2.00
Lampholder	Urea		4	2.12	8.48

- to be cont'd-

APPENDIX 9 (cont'd)

MATERIAL COST

Component	Material	Specification	Qty. Rqd.	Unit Cost (HK$)	Material Cost (HK$)
Rubber Bushing			4	0.11	0.44
Mounting bracket cover			1	1.00	1.00
Capacitor		7.5 MFD Min 250V	1	3.41	3.41
Double Capacitor		7 + 14 MFD Min. 250V	1	8.75	8.75
Ball chain		6"	1	0.44	0.44
Ball chain		9"	1	0.44	0.44
Bubble sheet		7" x 5½"	2	0.089	0.18
Bubble bag		10" x 6"	2	0.063	0.12
Bubble bag		6" x 8"	1	0.122	0.12
Plastic bag		16" x 21"	1	0.116	0.12
Plastic bag		11½" x 6"	4	0.007	0.03
Plastic bag		13" x 16"	1	0.253	0.25
Tassel			2	0.70	0.14
Carton box			1	9.30	9.30
Polyfoam			1	22.00	22.00
Label		"SPEED"	1	0.018	0.02
Label		"H-9"	1	0.014	0.01
Label		"RELAMP WITH 25 WATT BULB MAX"	1	0.013	0.01
Label		"WHITE COMMON"	1	0.013	0.01
Label		"FOR FAN CONNECTION"	1	0.013	0.01
Label		"FOR TOP LIGHT CONNECTION"	2	0.013	0.03
Label		"FOR LIGHT KIT CONNECTION"	1	0.015	0.02
Label		"DANGER - HIGH VOLTAGE DO NOT REMOVE COVER"	1	0.027	0.03
Label		"SERIAL NO."	1	0.022	0.02
Label		"RED"	1	0.014	0.01
Label		"EARTHING"	1	0.008	0.01
Label		"PATENT PENDING"	1	0.013	0.01
Label		"UL"	1	0.11	0.11
Label		"LIGHT"	1	0.018	0.02
Label		"CAUTION : MOUNT AT LEAST 7 FEET"	1	0.036	0.04
Red fibre			0.035 lb.	12.22/kg.	0.19
Shaft			1	5.10	5.10
Inner upper housing			1	6.01	6.01
Inner lower housing			1	6.90	6.90
Metal band			1	2.06	2.06
				Sub-total :	HK$166.95 (US$21.40)

- to be cont'd -

APPENDIX 9 (cont'd)

MATERIAL COST

(3) From Overseas

Component	Material	Specification	Qty. Rqd.	Unit Cost (HK$)	Material Cost (HK$)
Hex. nut	M.S.	BSP 3/8" x 10mm thk.	1	0.362	0.36
Ext. Tooth Washer		d = 16mm	2	0.161	0.32
Plain washer	M.S.	id = 16mm, od = 38mm, 3mm thk.	1	0.117	0.12
Screw		MSP M4 x 10	3	0.017	0.51
Light bulb		120V 25W	4	1.52	6.08
Spring washer	M.S.	M4	6	0.044	0.03
Cap nut	M.S.	Tap M4 x 11.5 x 13.5mm lg.	3	0.072	0.22
Screw with Spring washer		MSP(+-) M6 x 15	8	0.069	0.55
Blade	Wood	With translucent glass	4	9.838	39.35
Plain washer		M5	12	0.029	0.35
Screw		MST M5 x 12	12	0.026	0.31
Hex. nut	M.S.	BSP 3/8" x 4mm thk.	3	0.18	0.54
Screw		MSP M4 x 8 cone pt.	14	0.037	0.52
Weld nut	M.S.	NPS 1/8" - 27	1	0.165	0.17
Screw	Brass	NPS 1/8" - 27	5	0.164	0.82
Nut		M6	8	0.026	0.21
Weld screw		M6 x 27	4	0.16	0.64
Weld nut		M4	9	0.035	0.32
Plain washer		M4	1	0.005	0.01
Pin terminal	Brass		5	0.112	0.56
Pull chain switch		1691	1	7.32	7.32
Pull chain switch		1689	1	7.137	7.14
Slide switch		Spot	1	1.25	1.25
Solderless terminal		E2-5	3	0.086	0.26
Close and connector	Nylon	CE-2	8	0.092	0.74
Close end connector	Nylon	CE-5	1	0.195	0.20
Wire connector	Plastic	AP-1	2	0.069	0.14
Shrinkage tube	Plastic	d = 7mm x 1mm thk.	2	1.55/m	0.25
Cable tie	Nylon		4	0.05/	0.20
Wire connector	Plastic	Eagle 44	4	0.084	0.34
Lock-in connector	Nylon	JST MLP-03, MLR-03	1	0.192	0.19
Lock-in connector	Nylon	JST MLP-02, MLR-02	1	0.356	0.36
Dessicant			3	0.298	0.90
Stator & Rotor			1	13.02	13.02
Copper wire		No. 30	0.3kg.	20.44/kg.	6.13
Cotton sleeve			1.75cm	0.332/m	0.01
Rivet			8	0.050	0.40
Ball bearings		10320, 10321	1 set	6.70	6.70
Screw	M.S.	M5 x 50	3	0.057	0.17
				Sub-total :	HK$97.71 (US$12.53)

TOTAL : US$34.87
========

APPENDIX 10

MACHINERIES, EQUIPMENT, FACTORY FACILITIES, TOOLS & DIES

(1) Machineries and Equipment	Unit Price	No. req'd	Amount US$
Center Lathe Ø400mm x 1500mm	3,500	1	3,500
Multi-Spindle Drilling M/C 9-Spindle Ø6.5mm	6,000	1	6,000
Multi-Spindle Drilling & Tapping M/C 4-Spindle Ø5mm	5,400	1	5,400
Vertical Drilling Machine Ø32mm	1,000	1	1,000
Vertical Drilling & Tapping M/C Ø16mm	300	2	600
Bench Type Drilling & Tapping M/C	230	7	1,610
Power Press 63 tons	850	2	1,700
Pneumatic Press	530	2	1,060
Grinder	180	1	180
Electronic Balance	1,700	3	5,100
Automatic Carton Box Sealer	4,000	1	4,000
Belt Conveyor 30 ft.	1,500	2	3,000
Vibration Meter	760	5	3,800
Hi-pot Tester	210	5	1,050
A.C. Generator - 60 Hz output	770	2	1,340
Pneumatic Screw Driver	125	10	1,250
Pneumatic Carton Box Stapler	170	2	340
Roller Conveyor 10 ft.	370	3	1,110
Trolley	50	25	1,250
Rack	45	20	900
Hand Pallet Truck 2 tons	320	3	960
Work Bench	100	25	2,500
Other Equipment and Insturments	-	-	2,000
	TOTAL		49,650

(2) Factory Facilities

	Amount US$	
Partition and other Construction Work Spray painting room, store, floor metal sheets, exits, etc.		1,000
Compressed Air System		
15 Hp Compressor	1,900	
Piping Ø1-2/8", approx. 120 ft., 20 feed points	1,000	
Water Seperator 4 units	400	3,300
Electrical Installation TP&N 600A		8,000
Lighting - 22,000 sq. ft.		1,700
Ventilation		
Exhaust and Ductings, etc.	4,000	
Ceiling Fans, Pedestal Fans, and Wall Fans, etc.	2,000	6,000
	TOTAL	20,000

- to be continued -

APPENDIX 10 (cont'd)

MACHINERIES, EQUIPMENT, FACTORY FACILITIES, TOOLS & DIES

(3) Tools and Dies	No. of Sets	Amount US$
Press Dies		
Wire Clamp Plate	2	400
Wire Mesh Clamp Plate	2	300
Yoke Clamp Clip	1	300
Wire Mesh Cutting	1	160
Switch Housing Punching	1	150
Die Casting Moulds		
Canopy	1	3,200
Yoke	1	3,000
Upper & Lower Cover	1	4,500
Switch Housing & Cover	1	3,800
Blade Mounting	1	3,800
Injection Moulds		
Polyfoam - 2 pieces	2	1,500
Jigs & Fixtures		
Projection Welding	2	900
Upper Cover Sub-assembly	2	300
Drill Jig	15	1,200
Others	-	1,000
Hand Tools	-	3,000
	TOTAL	27,510

APPENDIX 11

MANPOWER REQUIRED

	Number Required	
Machine Shop		
Foreman - machine setting, supervision, etc.	1	
Lathe Operator	1	
Drilling/Tapping M/C Operator	12	
Press Operator	2	16
Painting Section		
Foreman - paint preparation, supervision, etc.	1	
Spray Painter	6	7
Assembly Section		
Foreman	1	
Assistant Foreman	2	
Operator	68	71
Quality Control		
Quality Control Foreman	1	
Incoming Quality Control Inspector	6	
In-process Quality Control Inspector	5	
Quality Assurance Inspector	2	14
General		
General Foreman - overall supervision	1	
Production Assistant - stock keepign, production follow up, etc.	1	
Maintenance Technician	1	
Material Handler	2	
General Worker - cleaning, services, etc.	2	7
		115

APPENDIX 12

WAGES & SALARIES (US$)

	No.	Monthly Income (US$)	Monthly Amount (US$)	Yearly Amount (US$)	
Monthly Staff[a]					
General Foreman	1	500	500	6,000	
Production Assistant	1	270	270	3,240	
Foreman	4	380	1,520	18,240	
Assistant Foreman	2	270	540	6,480	
Maintenance Technician	1	270	270	3,240	37,200
Indirect Labour[b]					
Material Handler	2	260	520	6,240	
General Worker	2	250	500	6,000	12,240
Direct Labour					
Unskilled Labour	68	250	17,000	204,000	
Semi-skilled Labour	12	260	3,120	37,440	
Skilled Labour	9	280	2,520	30,240	
Inspector	13	260	3,380	40,560	312,240
TOTAL	115		30,140		361,680

NOTES

a) Monthly income includes basic salary plus the 13th month's pay, meal and transportation allowances, medical and workmen compensation insurances, central provident fund and year-end bonus.

b) Monthly income includes basic wages plus attendance and punctuality bonuses, meal,transportation and medical allowances, workmen compensation insurance, annual leaves, statutory holidays, and year-end bonus.

APPENDIX 13

MONTHLY FACTORY OVERHEAD (US$)

	Year 1	Year 2	Year 3	Year 4	Year 5
Indirect Materials[a]	1,200	1,260	1,323	1,389	1,458
Indirect Labour[b]	1,020	1,122	1,234	1,358	1,494
Water & Electricity[c]	800	880	968	1,065	1,172
Rents & Rates[d]	5,060	5,566	6,123	6,735	7,409
Production Staff Salaries[e]	3,100	3,472	3,889	4,355	4,878
Insurance[f]	178	195	213	235	258
Maintenance[g]	300	315	330	347	365
Miscellaneous[h]	200	210	221	232	243
Monthly Factory Overhead Excluding Depreciation	11,858	13,020	14,301	15,716	17,277
Depreciation[i]	1,974	1,974	2,557	2,557	3,204
TOTAL MONTHLY FACTORY OVERHEAD	13,832	14,994	16,858	18,273	20,481

NOTES :

(a) Indirect Materials include machine tools, chemicals, sundries etc. - variable overhead, price 5% increase per year.

(b) Indirect Labour - fixed overhead, price 10% increase per year.

(c) Water & Electricity - varible overhead, price 10% increase per year.

(d) Rents & Rates - fixed overhead, 22,000 sq. ft. @ US$0.23 sq. ft. price 10% increase per year.

(e) Supervisory Salaries - fixed overhead, price 12% increase per year.

-to be cont'd-

APPENDIX 13 (cont'd)

MONTHLY FACTORY OVERHEAD (US$)

(f) Insurance on goods & merchandise, machineries & tools, premium @ 0.6% per annum.

	US$
Machineries & Equipment	49,650
Factory Facilities	20,000
Tools & Dies	27,510
Finished Goods	35,170
Work-in-process	98,780
Raw Materials in Factory	125,990
Total Content	357,070

Total content increases at about 10% per annum.

(g) Maintenance of machineries & equipment, factory facilities etc. - fixed overhead, price 5% increase per year.

(h) Miscellaneous - fixed overhead, price 5% increase per year.

(i) Depreciation on machineries & equipment, and factory facilities - 5 years straight-line basis. Machineries, equipment, and facilities of US$35,000 have to be purchased and installed in the third year for expansion purposes. Depreciation on tools and dies - 2 years straight-line basis. Tools and dies have to be replaced after every two years - price 5% increase per year.

APPENDIX 14

OPERATING COST AND SELLING PRICE PER UNIT (US$)

	Year 1	Year 2	Year 3	Year 4	Year 5
Direct Material Cost[a]	34.87	36.61	38.44	40.37	42.38
Direct Labour Cost[b]	4.16	3.82	3.50	3.22	2.93
Prime Cost	39.03	40.43	41.94	43.59	45.31
Factory Overhead/Unit Excluding Depreciation	1.90	1.74	1.59	1.46	1.33
Total Manufacturing Cost/Unit Excluding Depreciation	40.93	42.17	43.53	45.05	46.64
Depreciation on Machineries, Facilities, Tools & Dies	0.32	0.26	0.28	0.24	0.25
TOTAL MANUFACTURING COST/UNIT	41.25	42.43	43.81	45.29	46.89
Selling Expenses					
Fixed Cost[c]	0.30	0.32	0.33	0.35	0.36
Variable Cost[d]	0.10	0.11	0.11	0.12	0.12
	0.40	0.43	0.44	0.47	0.48
Administrative Expenses					
Fixed Cost[e]	1.20	1.26	1.32	1.39	1.46
TOTAL OPERATING COST/UNIT	42.85	44.12	45.57	47.15	48.83
Profit Margin/Unit	17.15	13.73	10.68	6.85	1.77
SELLING PRICE/UNIT	60.00	57.85	56.25	54.00	50.60

NOTES :

(a) Direct Material Cost - price 5% increase per year.

(b) Direct Labour Cost - price 10% increase per year.

(c) Fixed Cost of Selling Expenses include customers entertainment, overseas travelling, printing materials, communication and sales promotion etc. - price 5% increase per year.

(d) Variable Costs of Selling Expenses include, container handling charges, transportation from factory to shipping terminal, certificate and export declaration charges etc. - price 5% increase per year.

(e) Fixed Costs of Administrative Expenses include administrative salaries & allowances, communication & correspondences, stationeries, office maintenance & services, rent & rates, staff welfare, medical schemes and insurances etc. - price 5% increase per year.

APPENDIX 15

BUDGETED CASH FLOW FOR FIRST YEAR (US$)

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Year 1 Total
Opening Balance	-	56,312	63,864	70,416	-
Cash inflows :					
Collection from customers (a)	-	1,125,000	1,125,000	1,125,000	3,375,000
Total cash available before financing	-	1,181,312	1,188,864	1,195,416	3,375,000
Cash outflows :					
Purchases & instalation of fixed assets (b)	97,160	-	-	-	97,160
Merchandise (overseas) (c)	-	234,938	234,938	234,938	704,814
Merchandise (from Wing Tat) (d)	17,625	17,625	17,625	17,625	70,500
Merchandise (local) (e)	267,500	401,250	401,250	401,250	1,471,250
Wages & Salaries (f)	60,280	90,420	90,420	90,420	331,540
Water & electricity (g)	1,600	2,400	2,400	2,400	8,800
Rent & rates (h)	25,300	15,180	15,180	15,180	70,840
Insurance (i)	2,136	-	-	-	2,136
Maintenance (j)	900	900	900	900	3,600
Miscellaneous (j)	600	600	600	600	2,400
Selling & administrative expenses (j)	20,000	30,000	30,000	30,000	110,000
Texation (k)	-	-	-	-	-
Total Cash Required	493,101	793,313	793,313	793,313	2,873,040
Excess (deficiency) of total cash available over total cash required before financing	(493,101)	387,999	395,551	402,103	501,960
Financing					
Bank loan (at beginning) (l)	550,000	-	-	-	550,000
Repayment (at end)	-	(300,000)	(250,000)	-	(550,000)
Interest payment (m)	-	(23,548)	(14,548)	(7,048)	(45,144)
Bank charges (n)	(587)	(587)	(587)	(587)	(2,348)
Cash drawn away (o)	-	-	(60,000)	(320,000)	(380,000)
Total effects of financing	549,413	(324,135)	(325,135)	(327,635)	(427,492)
Closing balance	56,312	63,864	70,416	74,468	74,468

APPENDIX 16

BUDGETED CASH FLOW FOR FIVE YEARS (US$)

	Year 1	Year 2	Year 3	Year 4	Year 5
Opening balance	-	74,468	37,915	35,327	49,691
Cash inflows :					
Collection from customers (a)	3,375,000	5,029,875	5,857,875	6,743,250	7,661,700
Total cash available before financing	3,375.000	5,104,343	5,895,790	6,778,577	7,711,391
Cash outflows :					
Purchases & instalation of fixed assets (b)	97,160	-	65,330	-	33,439
Merchandise (oversesa) (c)	704,814	1,123,238	1,414,710	1,782,714	2,249,858
Merchandise (from Wing Tat) (d)	70,500	89,100	112,320	140,612	177,840
Merchandise(local) (e)	1,471,250	1,987,525	2,503,935	3,141,364	3,985,708
Wages & Salaries (f)	331,540	395,516	435,893	480,404	529,500
Water & electricity (g)	8,800	10,480	11,528	12,683	13,957
Rent & rates (h)	70,840	66,792	73,476	80,820	88,908
Insurance (i)	2,136	2,340	2,556	2,820	3,096
Maintenance (j)	3,600	3,780	3,960	4,164	4,380
Miscellancous (j)	2,400	2,520	2,652	2,784	2,916
Selling & administrative expenses (j)	110,000	144,000	190,080	239,940	302,640
Taxation (k)	-	204,480	197,854	182,644	136,247
Total Cash required	2,873,040	4,029,771	5,014,294	6,070,949	7,528,489
Excess (deficiency) of total cash available over total cash required before financing	501,960	1,074,572	881,496	707,628	182,902
Financing :					
Bank loan (at beginning) (l)	550,000	-	-	-	-
Repayment (at end)	(550,000)	-	-	-	-
Interest payment (m)	(45,144)	(33,697)	(42,441)	(53,480)	(67,555)
Bank charges (n)	(2,348)	(2,960)	(3,728)	(4,457)	(5,630)
Cash drawn away (o)	(380,000)	(1,000,000)	(800,000)	(600,000)	(60,000)
Total effects of financing	(427,492)	(1,036,657)	(846,169)	(657,937)	(133,185)
Closing balance	74,468	37,915	35,327	49,691	49,717

Notes to Appendix 15 & 16

NOTES :

(a) Collection from customers - as a usual practice through L/C . 30 days. The first collection is assumed to be 90 days after commencement of production.

(b) Instalation of machineries and facilities of US$35,000 required in year 3 for increase of maximum - production capacity from daily output of 250 sets to 520 sets. Purchases of tools & dies required in year 3 (US$30,330) and year 5 (US$33,439) for replacement in every two years.

(c) Overseas merchandise paid by L/C at sight. Normally the bank offered 90 days T/R.

(d) Merchandise from other sections of Wing Tat - assuming payment on delivery because Wing Tat should have paid for those raw materials costs after sub-processing in other sections.

(e) Local merchandise - one month credit.

(f) Wages & salaries - paid by end of each month.

(g) Water & electricity - paid after one month. Deposits paid by bank guarantee.

(h) Rent & rates - deposit of 2 months required, payable on commencement of the lease contract for 5 years. Rent & rates payable at the beginning of each month. Rates are inclusive in the monthly rental although the landlord pays the rates to the government on quarterly basis.

(i) Insurance - paid annually.

(j) Maintenance, miscellaneous, selling & administrative expenses etc. paid in the month incurred.

(k) Taxation - paid in the following year.

(l) Bank loan - financing of the project probably by bank loan, overdraft and other banking facilities from Wing Tat.

(m) Interest at 12% per annum for both loan and trust receipts (T/R).

(n) Bank charges - L/C openign charges at 0.25%.

(o) Cash drawn away - cash generated from the project and available for other investments of Wing Tat.

APPENDIX 17

PROFORMA PROFIT & LOSS AND APPROPRIATION STATEMENT (US$)

	Year 1	Year 2	Year 3	Year 4	Year 5
Sales : Quantity (in sets)	75,000	90,000	108,000	129,000	156,000
Revenue	4,500,000	5,206,500	6,075,000	6,966,000	7,893,600
LESS :					
Direct Material	2,615,250	3,294,900	4,151,520	5,207,730	6,611,280
Direct Labour	312,000	343,800	378,000	415,380	457,080
	2,927,250	3,638,700	4,529,520	5,623,110	7,068,360
Indirect Material	14,400	15,120	15,876	16,668	17,496
Indirect Labour	12,240	13,464	14,808	16,296	17,928
Water & Electricity	9,600	10,560	11,616	12,780	14,064
Rent & Rates	60,720	66,792	73,476	80,820	88,908
Production Staff Salaries	37,200	41,664	46,668	52,260	58,536
Insurance	2,136	2,340	2,556	2,820	3,096
Maintenance	3,600	3,780	3,960	4,164	4,380
Miscellaneous	2,400	2,520	2,652	2,784	2,916
Depreciation	23,688	23,688	30,684	30,684	38,448
Factory Overhead	165,984	179,928	202,296	219,276	245,772
Cost of Goods Sold	3,093,234	3,818,628	4,731,816	5,842,386	7,314,132
Gross Profit	1,406,766	1,387,872	1,343,184	1,123,614	579,468
LESS :					
Selling Expenses	30,000	38,700	47,520	60,630	74,880
Administrative Expenses	90,000	113,400	142,560	179,310	227,760
Operating Income	1,286,766	1,235,772	1,153,104	883,674	276,828
LESS :					
Interest Payments	45,144	33,697	42,441	53,480	67,555
Bank Charges	2,348	2,960	3,728	4,457	5,630
Net Profit before Tax	1,239,274	1,199,115	1,106,935	825,737	203,643
LESS :					
Tax @ 16.5%	204,480	197,854	182,644	136,247	33,601
NET PROFIT AFTER TAX	1,034,794	1,001,261	924,291	689,490	170,042
LESS :					
Cash drawn away	380,000	1,000,000	800,000	600,000	60,000
To Retained Earnings	654,794	1,261	124,291	89,490	110,042

APPENDIX 18

BALANCE SHEET (US$)

	1st Year End	2nd Year End	3rd Year End	4th Year End	5th Year End
Retained Earnings	654,794	656,055	780,346	869,836	979,878
Tax Reserved	204,480	197,854	182,644	136,247	33,601
TOTAL	859,274	853,909	962,990	1,006,083	1,013,479
Machineries & Facilities	69,650	69,650	104,650	104,650	104,650
Less : Depreciation	13,930	27,860	48,790	69,720	90,650
	55,720	41,790	55,860	34,930	14,000
Tools & Dies	27,510	27,510	30,330	30,330	33,439
Less : Depreciation	13,755	27,510	15,165	15,165	16,720
	13,755	-	15,165	-	16,719
Fixed Assets	69,475	41,790	71,025	34,930	30,719
Raw Materials	264,323	333,099	419,562	526,354	668,226
Work-in-process	67,031	68,949	71,191	73,596	76,196
Finished Goods	66,000	67,888	70,096	72,464	75,024
Total Inventories	397,354	469,936	560,849	672,414	819,446
Prepaid Rent	10,120	10,120	10,120	10,120	10,120
Accounts Receivable	442,407	463,553	498,947	506,271	442,778
Cash	74,468	37,915	35,327	49,691	49,717
Current Assets	924,349	981,524	1,105,243	1,238,496	1,322,061
LESS					
Accrued Water & Electricity	800	880	968	1,065	1,171
Accounts Payable	133,750	168,525	212,310	266,278	338,130
Current Liabilities	134,550	169,405	213,278	267,343	339,301
Working Capital	789,799	812,119	891,965	971,153	982,760
TOTAL	859,274	853,909	962,990	1,006,083	1,013,479

- to be cont'd -

APPENDIX 18 (cont'd)

BALANCE SHEET (US$)

NOTES :

a. Depreciation on machineries & facilities - 5 years straight-line basis.

b. Depreciation on tools & dies - 2 years straight-line basis.

c. Raw materials stock
   i) From overseas - stock of 39 working days' production (1½ month), about ⅔ in factory and ⅓ on sea.
   ii) From other sections of Wing Tat - stock of 13 working days' production (½ month).
   iii) From local vendors - stock of 26 working days' production (1 month).

d. Work-in-process - equivalent to 13 working days' half-finished goods.

e. Finished goods stock - average about 1,600 sets (two containers).

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